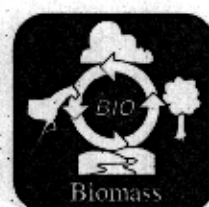


Nebraska Energy Office Annual Report 1997



E • N • E • R • G • Y



STATE OF NEBRASKA



E. Benjamin Nelson
Governor

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February 13, 1998

Dear Nebraskans:

The agency's success story remains its Dollar and Energy Saving Loans available to all Nebraskans at more than 600 locations across the state. As of June 30, 1997, more than \$80 million have been loaned to Nebraskans for more than 13,000 energy efficiency improvement projects.

Since the loans became available in mid-1990, 92 percent of the loans have financed projects in the homes of Nebraskans. Each year, about 1,700 new loans finance projects totaling \$10.8 million. Of this amount, nearly \$10 million is spent on residential improvements, making this the state's largest housing rehabilitation effort, albeit narrowly focused on energy efficiency.

When viewed from an environmental standpoint, the loans may represent the state's largest, on-going commitment to greenhouse gas emissions reductions. Greenhouse gases — carbon dioxide, sulfur dioxide, nitrous oxides and particulates — are responsible for air pollution, acid rain, and global warming. Each year, the improvements made with the loans account for reductions of 40,000 tons of carbon dioxide, 142,500 pounds of sulfur dioxide and nearly one-quarter of a million pounds of nitrous oxides. Putting some of the carbon dioxide reductions into context, in seven years, the agency's loans have resulted in the equivalent of removing 9,516 vehicles from the state's roads.

Through June 1997, the loans have created the equivalent of 1,416 jobs, primarily among heating and cooling contractors and remodeling industries all across the state.

The savings earned by Nebraskans who used the loans to finance improvements in their homes came in two ways: savings from reductions in energy use and savings from lowered financing costs. Since 1990, the dollars saved by Nebraskans from reduced energy use total \$16.9 million and the savings from the reduced financing costs total \$15.86 million.

Details of the agency's loan effort and other successes can be found in the Energy Office's 1996-1997 *Annual Report*. It is with great pleasure that I present this *Report* to you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ben Nelson", written over a horizontal line.

E. BENJAMIN NELSON
Governor

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Energy Projects Division

The Energy Projects Division is responsible for administering the federally-funded State Energy Program created under the *Energy Policy Conservation Act* of 1975. The program allows the state to use its discretion in providing energy conservation services, but the Energy Office must submit an annual plan to the U.S. Department of Energy for review and approval.

In general, agency staff operates the program directly. Occasionally, the agency may work closely with outside contractors hired to perform specific projects. The Division is also responsible for preparing annual energy saving reports, *Nebraska Energy Statistics*, the agency's *Annual Report*, the *Nebraska Energy Quarterly* and federal or court reports on oil overcharge programs.

Figure 1 shows estimated energy savings over the past 10 years as a result of specific projects.

State Energy Program

Since the inception of the State Energy Program, the federal government has granted funds on an 80/20 matching basis to the states. In 1996-1997, Nebraska received \$318,800 in federal funds which were matched with \$63,760 in state severance tax funds.

Beginning in 1996, the U.S. Department of Energy began offering discretionary, competitive grants to the states for work in selected areas. In August 1996, the Energy Office received \$370,000 for multi-year efforts to expand the agency's work with commercial and industrial businesses as

well as multi-family housing groups and public building operators in the state. The specific projects focus on increasing energy efficiency and reducing pollution (More information on these grants appears on page 3). Nebraska ranked as the fourth largest recipient out of the 48 states that applied for the competitive grants.

In 1996-1997, State Energy Program projects included:

- ◆ Federally-mandated projects
- ◆ Oil overcharge project management
- ◆ Energy shortage management and emergency preparedness
- ◆ Energy policy implementation
- ◆ Education and information
- ◆ Special projects including Climate Wise, Rebuild Nebraska and Federal Energy Management Program

Federally-Mandated Projects

According to the *Energy Policy Conservation Act*, the Energy Office must undertake mandatory projects in the specific areas of procurement, transportation, lighting standards, thermal standards and right-turn-on-red. The agency submitted plans to the federal government for its review and approval of project activities in these areas:

- ◆ The Energy Office coordinates and publishes a rideshare roster for state employees seeking to carpool. Eighty-five state workers are listed on the roster from communities surrounding Lincoln.
- ◆ Nebraska satisfied the right-turn-on-red mandatory in 1973 when the Legislature passed both right-turn-on-red and left-turn-on-red legislation.
- ◆ Nebraska satisfied the minimum mandatory requirements in 1980 when the Legislature passed thermal efficiency standards, lighting efficiency standards and procurement procedures for state government.

Oil Overcharge Project Management

Exxon oil overcharge projects are managed as State Energy Program projects (see pages 4-7 for a full description of projects financed by oil overcharge funds).

Gasoline Equivalent Saved by State Energy Program Activities, 1986-1996 (Millions of Gallons)

Project Type	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Agricultural Energy Management	0.744	0.992	1.240	1.240	1.400	1.400	1.400	1.400	1.400	1.400
Dollar and Energy Saving Loan Program	0	0	0	0	0.201	1.299	2.241	2.686	3.208	4.021
Hundred Points of Light	0	0	0	0	0	0	0.247	0.345	0.350	0.355
Municipal Loan Programs	0	0	0	0	0.011	0.018	0.039	0.072	0.099	0.103
Nebraska Community Energy Management Program	0.336	0.384	0.384	0.392	0.392	0.392	0.388	0.388	0.389	0.389
Omaha Traffic Program	0	0	0	1.803	1.803	1.803	1.803	1.803	1.803	1.803
Public Buildings (including Green Lights)	0	0	0	0	0.003	0.083	0.083	0.083	0.083	0.179
Ride Share	0	0	0	0	0	0	0.032	0.049	0.048	0.040
Thermal Lighting Standards	14.904	18.768	22.368	26.080	30.144	33.304	36.840	40.544	44.664	48.592
Total Gallons of Gasoline Saved (in millions)	15.984	20.144	23.992	29.515	33.954	38.299	43.073	47.370	52.044	56.882

Source: Nebraska Energy Office

Figure 1

Energy Shortage Management and Emergency Preparedness

As part of the agency's energy shortage and emergency activities, the Energy Office routinely monitors supplies and potential disruptions. Minor fuel outages are expected during planting and harvesting times. Monitoring is more intense during times when seasonal demands are high because of sudden weather changes. Contingency plans developed in prior years provide the structure for any necessary energy emergency activities.

During the reporting period, lower than normal inventories of heating fuels coupled with heavier than normal demand caused sharply higher prices for propane and natural gas. Early winter weather was superimposed on a bumper corn crop which was late, resulting in an extraordinary heavy demand for propane and other heating fuel. In November 1996, wholesale propane prices doubled and remained high until the end of January 1997.

Prices in the usually stable natural gas market also were volatile during the same period.

the reporting period, the *Quarterly and Statistics* became available on the agency's web site.

In 1993, the Energy Office established an Energy Education and Information Center as a means to centralize, organize and disseminate education and information resources to the general public. Since 1994, the Center's statewide energy education activities have been operated by the Nebraska Math and Science Initiative. The agency has actively promoted the use of national information services developed by the U.S. Department of Energy and others on Internet.

Energy Policy Implementation

In 1992, the Energy Policy Council forwarded to the Governor the *Nebraska Energy Policy Plan: Recommendations to the Governor* for his consideration.

By the end of that year, the Governor announced the first energy policy plan for the state — *An Energy Action Plan for Nebraska*. The *Action Plan* served as the first step in an on-going process to plan and implement effective programs to advance conservation and efficient use of traditional, nonrenewable energy sources, encourage the development of alternate and renewable energy sources and further energy-related economic development.

During the past four and a-half years, the Energy Office has undertaken the *Action Plan's* 20 objectives.

Education and Information Services

Education is needed by consumers to make sound energy decisions. The Energy Office identified and delivered educational opportunities and information resources through a coordinated statewide effort.

The agency published and distributed the *Nebraska Energy Quarterly* to thousands of Nebraskans. The *Quarterly* highlights a variety of energy efficiency projects and topics. Two mandated agency activities, production of an *Annual Report* and compiling *Nebraska Energy Statistics*, were also maintained. During

Nebraska Energy Settlement Fund A Summary of Exxon, Stripper Well and Diamond Shamrock Oil Overcharge Funds as of June 30, 1997

	Exxon	Stripper Well	Diamond Shamrock	Total
Total Received	\$15,504,944	\$14,698,768	\$359,172	\$30,562,884
Interest Earned	8,327,602	5,160,639	212,513	13,700,754
Total	\$23,832,546	\$19,859,407	\$571,685	\$44,263,638
Funds Budgeted				
Contracts	\$4,022,370	\$6,151,210	\$0	\$10,173,580
Program Development	103,692	0	6,434	110,126
Monitoring/Evaluation	361,527	0	0	361,527
Education	126,848	0	0	126,848
Load Management	50,039	0	0	50,039
Attorney General Legal Fees	0	299,327	0	299,327
Bank Wire Fees	0	98	0	98
Low Income Weatherization	4,022,371	3,599,774	0	7,622,145
Emergency Preparedness	45,907	0	0	45,907
Dollar & Energy Saving Loan Program	13,420,175	7,665,593	0	21,085,768
Loan Program Delivery	975,620	0	0	975,620
Special Projects	41,143	0	0	41,143
Designated Interest	559,475	1,535,979	0	2,095,454
Oil Overcharge Administration	0	384,199	556,065	940,264
Direct Restitution Project	0	0	9,186	9,186
Uncommitted Balance	\$103,379	\$223,227	\$0	\$326,606
Allocated to Low Income Programs	\$0	\$69,635	\$0	\$69,635
Allocated to Native American Programs	\$0	\$8,460	\$0	\$8,460

Source: Nebraska Energy Office

Figure 2

Oil Overcharge Contracts

Exxon

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1997
Energy Education	\$1,323,490	\$1,196,642	\$1,057,880
Financing Demonstrations	916,959	916,959	913,537
Agriculture	291,276	291,276	291,276
Feasibility Studies	187,993	187,993	187,993
Building Improvement Demonstration	729,499	729,499	729,499
Transportation	700,000	700,000	700,000
Load Management	50,039	50,039	50,039
Dollar and Energy Saving Loan Program	13,420,175	12,887,395	12,887,395
Low Income Weatherization	4,022,371	4,014,500	4,014,500
Total Exxon Contracts June 30, 1997	\$21,641,802	\$20,974,303	\$20,832,119

Stripper Well

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1997
Low Income Weatherization	\$3,599,773	\$2,559,584	\$2,288,475
State Buildings Energy Team	124,210	124,210	124,210
Local Government Energy Management Circuit Rider	400,000	400,000	352,564
Public Transportation	800,000	800,000	790,540
Energy Related Biotechnology, Solar and Conservation Outreach	2,000,000	2,000,000	1,809,768
Greenhouse Project	400,000	400,000	400,000
Innovative Energy Grants	100,000	75,000	24,198
Dollar and Energy Saving Loan Program	7,665,593	7,038,807	7,038,807
Indian Tribal Governments	77,000	77,000	68,472
University of Nebraska Building Weatherization	500,000	500,000	497,136
Nebraska State College System	1,500,000	1,500,000	1,494,959
Curtis Weatherization	250,000	250,000	231,861
Total Stripper Well Contracts June 30, 1997	\$17,416,576	\$15,724,601	\$15,120,990

Sources: Nebraska Energy Office

Figure 3

Special Projects

Climate Wise

In 1996-1997, the agency received a second federal energy department grant to enlist Nebraska manufacturers in a multi-year, voluntary energy efficiency and pollution prevention partnership called Climate Wise.

By June 1997, 22 Climate Wise partners had been recruited in Nebraska. Manufacturers that become partners gain

access to technical analysis of their operations as well as low-interest Dollar and Energy Saving Loans for making energy efficiency and pollution prevention improvements in their buildings and operations.

Collectively, the Energy Office received \$100,000 from the two U.S. Department of Energy Climate Wise grants. During this reporting period, the agency spent \$35,345 on this effort.

In 1995, the Energy Office was one of seven pilot states selected to operate a localized Climate Wise effort. The agency hoped to find 50 Climate Wise partners by mid-1997.

Federal Energy Management Program

In August 1996, the Energy Office received \$70,000 from the Federal Energy Management Program for a two-year effort to assist the Nebraska Military Department in identifying energy saving and renewable energy options in their buildings and operations.

During the reporting period, the agency became acquainted with military operational procedures, identified at least 44 buildings that would be assessed, began gathering energy and water use information and completed on-site inspections of nine buildings. Most of the buildings being analyzed are armories, however, support facilities, mechanical shops and storage and office buildings are also included in the assessment.

Through June 1997, the agency spent \$4,752 of these grant funds.

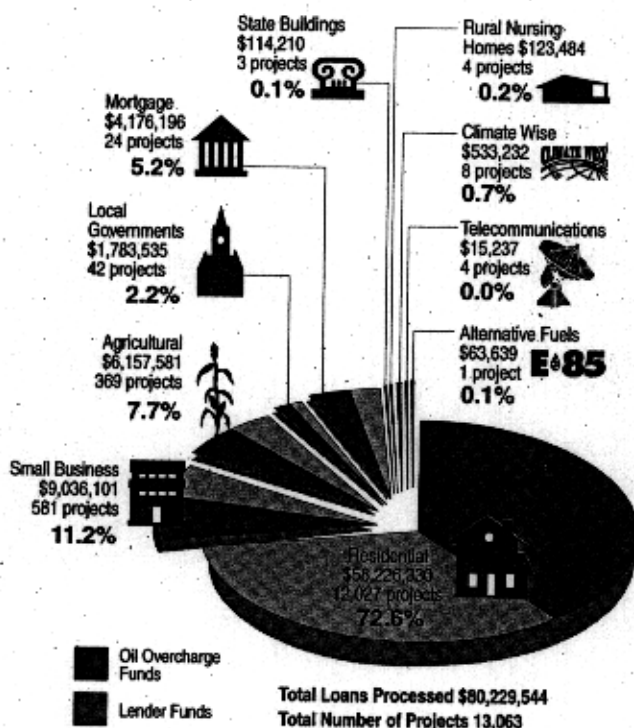
Rebuild Nebraska

In August 1996, the Energy Office received \$250,000 from the U.S. Department of Energy for a three year effort to increase the use of energy efficient technologies in existing commercial and multi-family buildings in Nebraska. The agency hoped to recruit 150 Rebuild partners by 1999.

By the end of the reporting period, the agency had recruited 42 building and marketing partners and completed energy audits of 20 buildings totaling more than 466,000 square feet.

On Rebuild Nebraska activities, the Energy Office spent \$23,607 during the fiscal year.

Oil Overcharge Funds Invested in Types of Dollar & Energy Saving Loans as of June 30, 1997



Source: Nebraska Energy Office

Figure 4

Oil Overcharge Funds

Since 1982, Nebraska has been receiving oil overcharge funds (sometimes referred to as Petroleum Violation Escrow Funds) as a result of various court actions against oil companies that overcharged their customers during the period of federal price controls from 1973 to 1981. Since direct compensation to injured consumers seemed unrealistic, the courts ordered that the money recovered from lawsuits be distributed to the states to fund programs that provide indirect restitution to injured energy consumers. States were directed to use the money, within parameters

financing for up to fifteen years on loans for energy saving improvements.

During the reporting period, the agency also received a \$250,000 waste reduction and recycling incentive grant from the state's Department of Environmental Quality. These funds were made available for loans to finance equipment and system improvements by businesses and manufacturers in the state.

The most common improvements in homes, apartments and small businesses are replacing furnaces, air conditioners and windows.

Popular agricultural improvements include installing low-pressure irrigation systems, replacing irrigation pumps and motors, making well modifications and replacing grain dryers. City and county governments and schools are generally replacing boilers, furnaces and installing heat pumps.

Some energy-saving improvements require an energy audit before a borrower may secure financing. These improvements may be financed for up to five, ten or fifteen years depending on the type of improvement, its cost and the amount of energy saved. Loans for energy audits are available directly from the Energy Office at no interest.

established by the courts, to fund energy assistance and conservation programs.

The agency's three programmatic divisions — Energy Financing, Energy Projects and Weatherization — manage projects financed by oil overcharge funds.

The Nebraska Energy Settlement Fund

The Nebraska Energy Settlement Fund was established by the Legislature for money paid to Nebraska from overcharge cases since March of 1986. Total funds (including interest) received as of June 30, 1997, were \$44.26 million: \$23.83 million in Exxon funds, \$19.86 million in Stripper Well funds and \$5.57 million in Diamond Shamrock funds (see figures 2 and 3 for specifics on how the funds have been used).

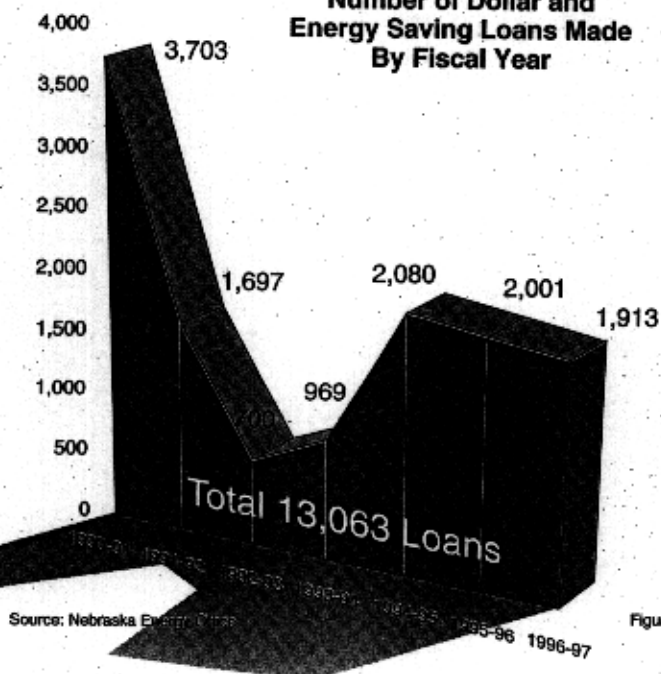
Specific Oil Overcharge Projects

Activity this year for each oil overcharge project financed by the Nebraska Energy Settlement Fund, reviewed by the Legislature and approved by the U.S. Department of Energy is described on this page and those that follow in this section.

Dollar and Energy Saving Loans

Exxon funds totaling \$13.42 million plus \$7.66 million in Stripper Well, \$.18 million in Amoco, \$.01 million in Coline, \$.08 million in National Helium and \$.17 million in Vickers funds (amounts include interest earnings) have capitalized the Dollar and Energy Saving Loan Program, which provides low-interest loans to Nebraska residents for home, building, transportation and system improvements. More than 320 participating lenders provide six percent interest rate

Number of Dollar and Energy Saving Loans Made By Fiscal Year



Source: Nebraska Energy Office

Figure 5

Applicants can obtain appropriate forms from the Energy Office, participating lenders, utilities or equipment dealers. After obtaining bids, applicants then submit loan forms to participating lenders at one of 655 sites across the state. Once a lender approves the loan application, a commitment agreement is submitted to the Energy Office for review. On final approval from the agency, the lender notifies the applicant to proceed with the energy improvement.

Since the loan program began more than seven years ago, 13,063 projects have been financed. More than \$41.46 million in oil overcharge funds (including interest, and loan repayments) have leveraged in excess of \$38.77 million from the state's private lenders. A total of more than \$80.23 million in low interest loans have been used to finance energy saving projects (see figure 4).

By nearly any measurement, the agency's greatest success remains its Dollar and Energy Saving Loans. Whether viewed as an environmental effort, a jobs creation undertaking, housing rejuvenation, or just plain "saving Nebraskans hard-earned dollars," these energy efficiency loans will continue to generate benefits for the state and its citizens for decades to come. Since the loan funds "recycle," these loans can continue to be offered to Nebraskans forever.

Ninety-two percent of the projects have financed energy efficiency improvements in the homes of Nebraskans. Each year, an average of 1,700 new loans finance projects totaling \$16.8 million. Of this amount, nearly \$10 million is spent on residential improvements, making this the state's largest, albeit narrowly focused on energy efficiency, housing rehabilitation effort.

When viewed from an environmental standpoint, the loans may represent the state's largest, on-going commitment to greenhouse gas emissions reductions. Greenhouse gases — carbon dioxide, sulfur dioxide, nitrous oxides and particulates — are responsible for air pollution, acid rain, and global warming. Each year, the improvements made with

the loans account for reductions of 40,000 tons of carbon dioxide, 142,500 pounds of sulfur dioxide and nearly one-quarter of a million pounds of nitrous oxides. Putting some of the carbon dioxide reductions into context, in seven years the agency's loans have resulted in the equivalent of removing 9,516 vehicles from the state's roads.

Through June 1997, the loans have created the equivalent of 1,416 jobs, primarily among heating and cooling contractors and remodeling industries all across the state.

The savings earned by Nebraskans who used the loans to finance improvements in their homes came in two ways: savings from reductions in energy use and savings from lowered financing costs. Since 1990, the dollars saved by Nebraskans from reduced energy use total \$16.9 million and the savings from the reduced financing costs total \$15.86 million.

Over the past several years, several new "categories" of projects eligible for financing have made the loans available for an increasing variety of energy-saving — and even, waste reduction — projects.

The receipt of a \$250,000 grant from the Department of Environmental Quality to finance projects that prevented pollution and reduced waste by the state's industries and businesses allowed the agency to expand Dollar and Energy Saving Loans to these types of projects. During the reporting period, one loan for \$30,358 was made to replace dry cleaning equipment.

Electrical Load Management Resource Fund

Created in 1983, the Electrical Load Management Resource Fund is capitalized with \$50,000 in Exxon oil overcharge funds. Under contract, NMPP Energy manages the loan applications and repayments.

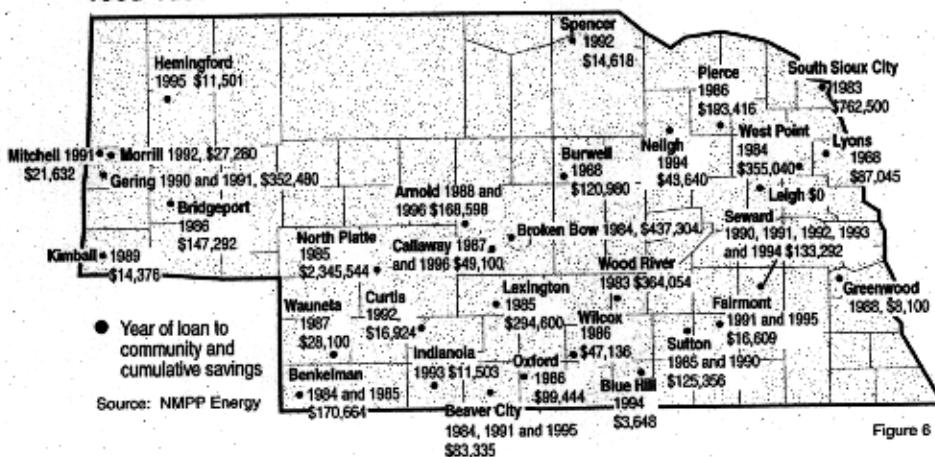
The fund offers interest-free financing to the 90-plus Nebraska utility members of NMPP Energy to help purchase, install or upgrade load management systems. These systems allow utilities to monitor and reduce peak demand, save energy and avoid being charged for expensive electricity used during peak times.

Over the 15 years of operation, the initial capital investment of \$50,000 has revolved more than ten times, saving ratepayers in the participating towns more than \$6.5 million (see figure 6). Communities that install load management systems continue to earn additional savings during the lifetime of the equipment.

In 1996-1997, two new loans were made:

- ◆ Arnold, \$12,000
- ◆ Leigh, \$10,000

Cumulative Savings of Communities Borrowing Electrical Load Management Resource Funds, 1983-1997



Total Estimated Savings to Date \$6,555,111

Innovative Energy Grants

Stripper Well funds totaling \$100,000 were available for grants to individuals for research and/or development of energy-related inventions.

In this program's seven years, 33 preapplications have been received. Of those, 11 have been invited to complete the full application. Six of the 11 were reviewed by the University of Nebraska for technical feasibility. The Energy Office, along with the University's Technical Assistance Center, developed evaluation criteria for project review. Research continued on these previously selected projects:

- ◆ A \$50,000 grant was awarded to Grain Systems of Elm Creek in 1993 to complete the design and fabrication of a prototype grain dryer which utilizes a heat pump to dehumidify drying air which circulates in a closed loop.
- ◆ A \$25,000 grant was awarded in 1994 to S-Arrow of Hastings to demonstrate a catalyst-enhanced pyrolysis process using waste tires. The process is expected to produce a fuel gas with higher energy content than that produced by typical pyrolysis.

Work on both these projects is scheduled for completion by the end of 1997.

Landlord Loan Program

This program, a component of the Dollar and Energy Saving Loan Program, became Weatherization Energy Efficient Mortgage Loans.

A more complete report on these loans appears on page 9.

Lincoln Energy Conservation Interest Subsidy and Rebate Program

This local subsidy and rebate program ended in 1991. Since some loans were retired earlier than planned, not all subsidies were fully utilized by the borrowers. Unused subsidies are returned to the Energy Office and totaled \$4,355 in 1996-1997.

Low-Income Weatherization Assistance Program

A total of \$7.62 million in oil overcharge funds (\$4.02 million from *Exxon* and \$3.6 million from *Stripper Well*) have been allocated to the Low-Income Weatherization Assistance Program to assist low-income Nebraskans with residential weatherization to reduce energy use and costs. In 1996-1997, \$61,476 in *Stripper Well* funds were spent through the program.

The terms of the *Stripper Well* court order mandate that an equitable share of the funds be set aside for the state's low-income population. To date, \$2,288,999 in *Stripper Well* funds have been spent.

For more detailed information about the Low-Income Weatherization Assistance Program, see pages 8 and 9.

Native American Tribal Governments

The *Stripper Well* court order requires the state to provide an equitable share of oil overcharge funds to Native American tribal governments. Based on the number of Native Americans in the state, \$77,000 have been set aside for eligible projects suggested by the tribal governments.

No projects were undertaken in 1996-1997. A total of \$8,528 remains for Native American projects.

Planning, Monitoring and Evaluating Oil Overcharge Programs

To comply with federal and court reporting regulations, \$384,199 in *Stripper Well* and \$450,000 in *Exxon* funds have been committed for planning, monitoring and evaluating programs funded with oil overcharge dollars. In 1996-1997, a total of \$28,141 (\$2,720 in *Stripper Well* and \$25,421 in *Exxon* funds) were spent. Also during this period, \$13,585 in *Exxon* funds from unexpended funds from previously approved projects were transferred from this activity and this work was concluded.

Schuyler Energy Conservation Loan Program

Schuyler city government and its Energy Commission continued to operate a low interest energy conservation loan program for homes, businesses, nonprofits and governmental buildings.

The loan pool was capitalized with \$178,007 in *Exxon* funds and \$199,500 from local lenders.

To date, ten commercial loans totaling \$148,272 (\$88,963 in *Exxon* funds) and 143 residential loans totaling \$404,700 (\$242,420 in *Exxon* funds) have been made. The program is scheduled to operate through 1997.

In 1994, Schuyler teamed \$25,000 in local keno revenues with \$50,000 from two local lenders to match \$75,000 in *Exxon* oil overcharge challenge loan funds from the Energy Office. This \$150,000 in no-interest funds leverages an equal amount from local lenders. The city then makes four percent energy conservation loans to local residents and businesses under the Dollar and Energy Saving Loan Program.

Statewide Energy Education

Two hundred thousand dollars in *Exxon* funds have been dedicated to coordinate statewide energy conservation instruction in grades kindergarten through twelve.

Starting in 1993, the Energy Office joined with the Nebraska Math and Science Initiative to further energy education in the state. The Initiative is a group of educators across the state and staff from the University of Nebraska-Lincoln working to improve science and math education.

In 1994, the Energy Office committed \$500,000 in *Exxon* oil overcharge funds to match a \$4.9 million grant — a total of \$10 million from the National Science Foundation — to achieve excellence in elementary and secondary math and science education. Since this project began, more than 1,961 teachers have attended energy education workshops and 188 grants totaling \$195,540 have been awarded for specific energy projects in schools across the state.

During the reporting period, \$246,733 was spent for teacher training and grants.

The Initiative continues to operate the agency's energy education resource library and maximize use of the Internet for locating and distributing energy education resources.

Work continues on this activity.

Stuart Energy Conservation Loan Program

While this local commercial loan program ceased making new loans in 1991, repayments from the borrowers will continue beyond the beginning of the next century. The portion of the loan funds being repaid to the Energy Office will continue to accrue in the project's account until all loans have been repaid.

University of Nebraska Energy-Related Research

The University of Nebraska received \$2 million in *Stripper Well* funds to further energy-related research. Projects selected must secure matching funds before qualifying for oil overcharge dollars.

Of twelve research projects, 11 are completed. The continuing project is headed by Dr. David Jones, of the University of Nebraska-Lincoln Department of Biological Systems Engineering. The \$170,000 project seeks to develop a binder using waste fluids from ethanol production. The binder is mixed with waste paper to produce fuel pellets. The match requirement of \$170,000 was met by a Nebraska research

pioneer who donated both money and equipment. The project is scheduled for completion in 1997.

Since the research projects began, \$1,809,768 in oil overcharge funds have been spent. This project is scheduled for completion in the next reporting period.

Other Energy Settlement Funds

Not all oil overcharge funds are part of the Nebraska Energy Settlement Fund. Some of these funds have been held in escrow by the U.S. Department of Energy and are distributed only when a plan is submitted by a state energy agency and approved by the federal energy agency's Office of Hearings and Appeals.

Oil overcharge settlement funds resulting from fines levied against *Amoco*, *Palo Pinto*, *Vickers* and other oil companies fall into this category. According to the Department of Energy, all future settlement funds received by the state will be classified as *Stripper Well* funds and not subject to review by the Office of Hearings and Appeals.

Specific Oil Overcharge Projects

The status of the only oil overcharge project financed with these miscellaneous funds is described on this page.

Statewide Energy Information Service

In 1992-1993, the Energy Office began to develop energy information services to assist consumers to make decisions resulting in the efficient and economic use of energy.

Funded with \$150,000 in *Amoco* funds, the agency began the process to develop and maintain a library collection. Displays on a variety of topics were developed or borrowed from other organizations. Informational materials were developed and distributed on energy topics at a variety of events. Since 1992, \$117,755 have been spent on energy information services.

1996 Predispersement Plan

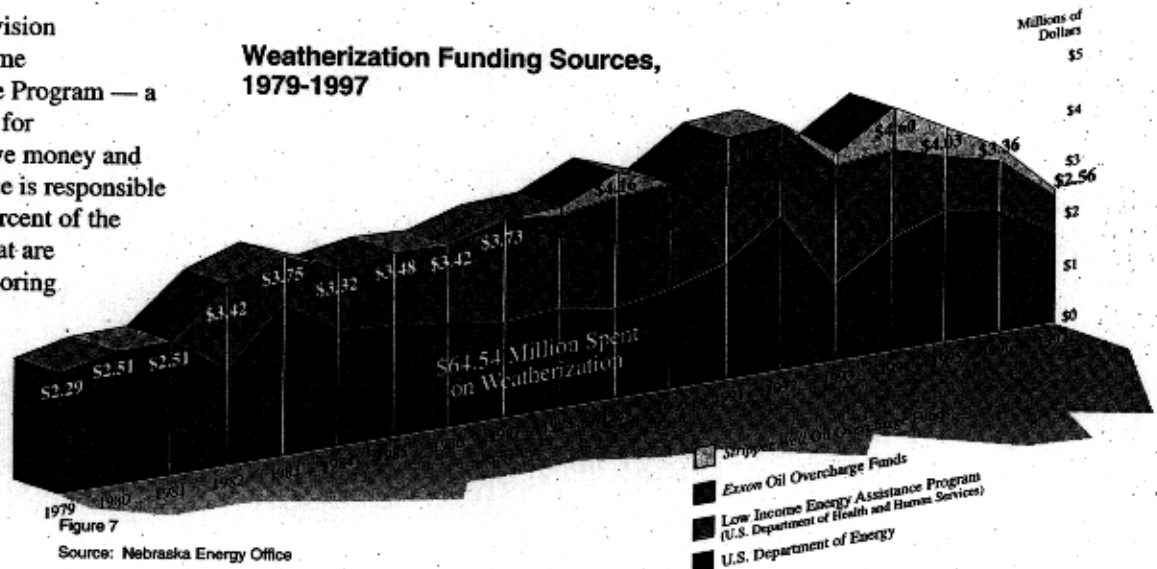
During the reporting period, the Governor submitted a plan for review by the Legislature for use of more than \$1.4 million in oil overcharge funds (\$285,256 in *Exxon* funds and \$1,123,135 in *Stripper Well* funds)

The plan, which was implemented, added \$1.1 million to the revolving loan pool to finance improvements with Dollar and Energy Saving Loans, \$289,953 to the Low-Income Weatherization Assistance Program and \$8,460 to Native American Tribal Governments.

Weatherization Division

The Weatherization Division administers the Low Income Weatherization Assistance Program — a federally-funded program for weatherizing homes to save money and energy. The Energy Office is responsible for inspecting about 24 percent of the homes — about 305 — that are weatherized and for monitoring and auditing the subgrantees, primarily community action agencies, that actually make the home weatherization improvements.

Weatherization Funding Sources, 1979-1997



1996-1997 Highlights

In 1995-1996, total funding for the program was \$2,563,340. The Department of Energy's Low Income Weatherization Assistance Program provided a total of \$1,363,040 and the Low Income Home Energy Assistance Program, administered through the Nebraska Department of Social Services, supplied a total of \$1,138,824. The balance of the funding — \$61,476 — came from the *Stripper Well* oil overcharge trust account.

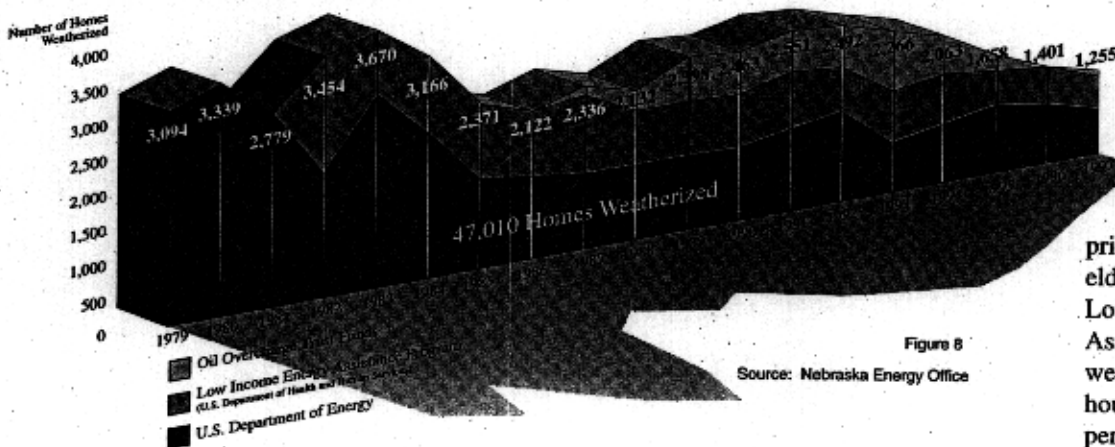
Total funding for this activity decreased nearly 24 percent from the previous year. Decreases in funding from the federal Department of Energy were only marginally offset by funding increases from the U.S. Department of Health and Human Services and oil overcharge funds. The only overcharge funds remaining to be used by the Weatherization Assistance Program are *Stripper Well* monies. Figure 7 shows the funding amounts and sources since the program began in 1979.

18 Years of Helping Nebraskans

Since the Low Income Weatherization Assistance Program began operation in the state in 1979, more than \$64 million in federal and oil overcharge funds have been spent to weatherize the homes of low-income elderly, disabled and others.

In the past 18 years, 47,010 homes have received free weatherization (see figure 8). However, an estimated 61,000 Nebraska homes remain eligible for this service.

Number of Homes Weatherized by Sources of Funds, 1979-1997



Homes Weatherized in 1996-1997

A total of 1,255 homes, were weatherized in fiscal year 1996-1997. In keeping with the agency's priority to serve Nebraska's elderly community through the Low Income Weatherization Assistance Program, the division weatherized 401 elderly households, or more than 31 percent of all homes improved during this period.

Nebraska Weatherization Assistance Program Service Areas and Homes Weatherized, July 1, 1996 - June 30, 1997

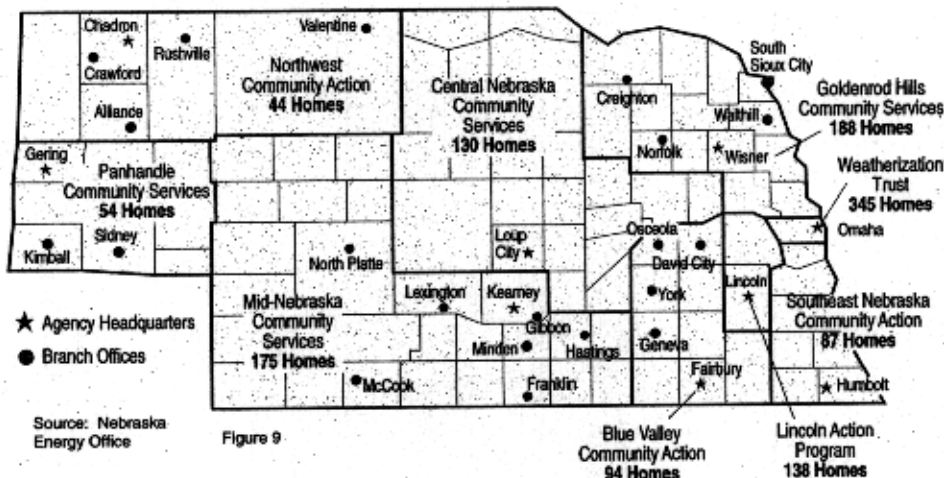


Figure 9

The map, figure 9, shows the nine Weatherization Assistance Program service areas and the number of homes weatherized in each area from July 1, 1996, through June 30, 1997.

Home improvements made through the program saved Nebraskans a total of more than \$158,130 in avoided energy costs during 1996-1997. The home improvements represent a one-time investment that most likely will yield a rate of return for at least twenty years.

Other Oil Overcharge Projects

In late 1995, the agency converted the Weatherization Assistance Program Loans for landlords unable to pay one-half the cost of the improvements to Weatherization Energy Efficient Mortgages for soon-to-be home buyers.

These new mortgages are limited to those families with incomes ranging from \$11,835 for a family of one to \$40,395 for a family of eight. The below-market-rate mortgages allow prospective home buyers to make necessary energy-saving home improvements without raising the cost of the monthly mortgage payment.

Funds to capitalize the Weatherization Energy Efficiency Mortgages came from two sources: \$100,000 from funds for Weatherization Assistance Program Landlord Loans — \$50,000 from a 1991-1992 U.S. Department of Energy incentive grant and \$50,000 in Exxon oil overcharge funds — and \$58,823 from a one-time federal Department of Energy grant received in 1995-1996 that distributed previously uncommitted weatherization funds to the states.

Since these mortgages became available, one loan for \$3,070 has been made.

Energy Savings A Reality

In August 1996, the agency completed the most extensive evaluation ever of the energy and dollar savings — including reductions in greenhouse gases — resulting from improvements made in the homes of needy Nebraskans by the Weatherization Assistance Program.

The evaluation found that the typical home saved an average of 18.7 percent on energy used for heating and resulted in a reduction of \$126 annually in utility bills.

A similar national study using 1989 information showed annual average energy savings of 13.5 percent and \$116 in each home.

The 1996 Nebraska findings range from 50 to nearly 100 percent higher than the 1989 national average for energy savings. Because the cost of energy in Nebraska is cheaper than many other areas of the nation, average dollar savings are only 15 percent above the national average.

The typical home's emissions savings, resulting from reduced energy use, averaged 2,297 pounds of carbon dioxide, less than one-half pound of sulfur dioxide and nearly $\frac{3}{4}$ of a pound of nitrogen oxides.

Aggregate savings from the 3,700-plus homes improved in the two years resulted in annual energy savings of 77.5 trillion British thermal units and an 18.7 percent overall reduction in energy use in the homes. The first year's dollar savings from reduced energy bills totaled \$468,064.

Annual Greenhouse gas reductions for all the houses totaled 4,284 short tons of carbon dioxide, 1,619 pounds of sulfur dioxide and 2,627 pounds of nitrogen oxides.

The evaluation examined a sample of the homes that received free weatherization services in 1993 through 1995.

Regional Training

During the previous reporting period, the agency received a \$10,000 grant from the regional office of the federal energy agency to provide technical training for weatherization professionals in the region.

However, because of a reorganization of the federal regional structure of the U.S. Department of Energy, Nebraska and three other Midwestern states joined with eight western and southern states.

After the reorganization, the Energy Office transferred the \$10,000 training grant to the Weatherization Managers Association, a technical working group from the 12 states. The \$10,000 will still be used for similar as well as expanded training opportunities for weatherization professionals.

Energy Efficiency, Renewable Energy, Nuclear Waste Transportation Issues and Other Energy Concerns

As the agency adapts to an ever-changing world of energy use and production, so the services and work performed by the Energy Office also change. During 1996-1997, the agency worked and funded, directly or indirectly, new activities that involved energy efficiency, renewable energy and nuclear waste transportation issues as well as the historical activities for which it is known.

Clean Cities

In 1996-1997, the Energy Office received several grants totaling \$30,000 to conduct a Midwestern regional Clean Cities town hall meeting. Clean Cities is a locally-based, voluntary government and industry partnership to expand the use of alternatives to gasoline and diesel fuel.

The town hall meeting was held in Omaha in September 1996. The primary focus of the gathering was to acquaint vehicle fleet managers in the region with higher percentage blended ethanol fuels and other alternative fuels such as soydiesel. Representatives for other fuel types — natural gas, propane and electricity — also presented information as well as displayed alternate fuel vehicles.

The \$30,000 in grants came from three sources: \$20,000 from the federal Department of Energy and \$5,000 each from the Great Lakes Biomass Energy Program and the Western Regional Biomass Energy Program.

During the reporting period, the agency spent \$20,624 on this project. The only remaining work was to finish the production of a videotape of the town hall meeting. That work will be completed in 1997.

High-Level Nuclear Waste Transportation and Storage

The majority of nuclear waste in Nebraska is produced by the two nuclear power stations in Brownville and Fort Calhoun. For storage purposes, radioactive waste material is classified as high-level or low-level waste depending on the length of time the waste remains radioactive.

High-level waste is spent nuclear fuel and has primarily been stored on site at nuclear power plants awaiting construction of a temporary or permanent repository.

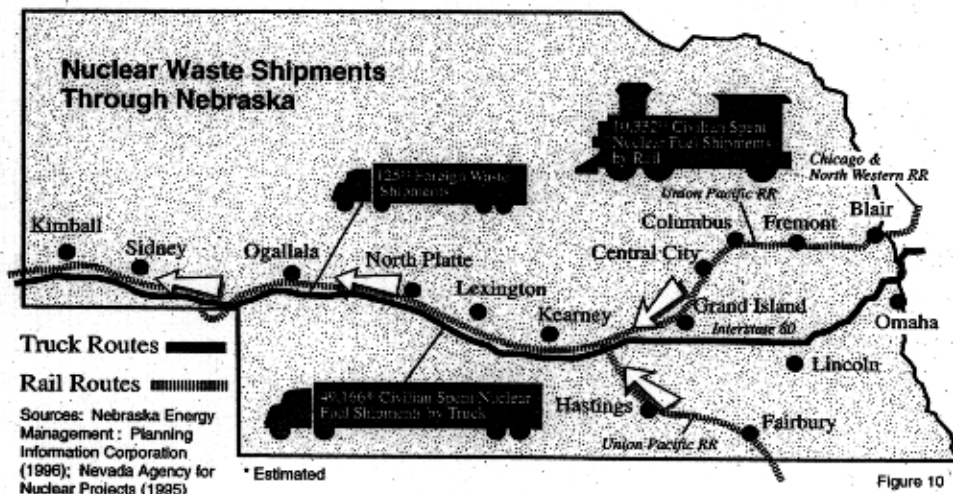
Once a temporary or permanent storage site becomes available, transporting the high-level waste will begin. Because many nuclear facilities are east of Nebraska and likely storage areas are west of the state, rail lines and highways in Nebraska are probable corridors for shipments of high-level radioactive waste.

Two national studies have indicated that 92,000 shipments of spent nuclear fuel and high-level radioactive waste

currently stored at sites across the nation will be shipped over a period of 30 years to temporary or permanent storage sites. Based on the latest information, it is estimated that 62 percent of the nation's truck shipments of spent nuclear fuel and 82 percent of the nation's rail shipments will cross Nebraska. Current projections indicate an estimated 49,166 truck shipments and 10,332 rail shipments will cross the state.

The Energy Office became involved in two issues related to the transportation and storage of spent nuclear fuel during the previous and current reporting periods:

- ◆ In the previous reporting period, Nebraska joined nearly 20 other states and several utilities in filing a lawsuit against the U.S. Department of Energy when the federal agency announced that it had no obligation to begin accepting nuclear waste until a storage facility was constructed. The Court of Appeals for the District of Columbia agreed with the states, ruling that the federal energy department must begin accepting nuclear shipments in 1998. The Energy Department has not determined how, when or where the agency will begin accepting spent nuclear fuel.



- ◆ In 1997, the Energy Office joined with Emergency Management, the State Patrol, the Department of Health and others to examine the state's readiness for a dramatic increase in the number of shipments of spent nuclear fuel across the state.

Hydropower Resources Assessment

In 1996, the Idaho National Engineering Laboratory completed a draft of a statistical assessment of potential hydropower resources in all states. The assessment projected the maximum amount of energy that could be produced if the sites were developed.

The Energy Office was then asked to evaluate their assessment of the Nebraska sites based on 20 factors such as recreational use, historic value and presence of endangered species. The state's Game and Parks Commission assisted the agency in completing the evaluation. The Energy Office is awaiting a \$2,500 grant as compensation for work on the assessment.

National Energy Code Compliance on New Home Construction

The agency was requested by the Nebraska office of the U.S. Department of Housing and Urban Development to review house plans of Nebraskans financing the purchase of their home with a Veterans' Administration, Farmers' Home Administration or Federal Home Administration mortgage. To be eligible for the government-backed mortgages, the homes must meet or exceed the 1993 Model Energy Code.

In 1996-1997, the agency evaluated an estimated 18 homes for compliance with the energy code. The agency charges \$50 for each review.

Wind Resource Assessment

In mid-1994, the Nebraska Power Association and other renewable energy interests including the Energy Office agreed to participate in a multi-year study of eight wind sites in the state for their energy producing potential.

On behalf of the Power Association, the agency applied to the Utility Wind Interest Group for a grant to partially fund the Nebraska wind study. In late 1995, the Power Association received a \$59,600 grant from the Interest Group.

In early 1996, the Energy Office received another grant in support of the Nebraska wind project. The National Renewable Energy Laboratory awarded a \$74,428 grant to also partially fund the project. A \$10,000 grant from the American Public Power Association was also received by the Power Association in support of the project. The state's major utilities are supplying the remainder of the cost of the study. The wind assessment, which concludes in December 1998, is expected to cost more than \$300,000.

The first year's assessment found that average annual wind speeds ranged from 14.6 to 16.8 miles per hour and generally were strongest in February and October and in the early afternoon. Valentine and Springview had the highest speeds at 16.8 and 16.7 miles per hour, respectively. The lowest wind speeds were recorded at Rushville and Wahoo, 14.6 and 14.8 miles per hour, respectively.

Ethanol and Other Alternate Fuels

Historically, the role of the Energy Office in the development of alternate transportation fuels has been that of advocate and demonstrator. The Governor requested the agency, in its role of energy policy advisor, to take a more active role in coordinating the development and use of ethanol-based fuels, not only in the state, but around the country as well.

1996-1997 Highlights

A number of issues and activities involved the agency as it fulfilled its role in fostering the growth of alternate transportation fuels, including ethanol.

America's Quest for Cleaner Transportation Fuels

With the passage of the amendments to the *Clean Air Act* in 1990 and the subsequent passage of the *Energy Policy Act* in 1992, cleaner burning fuels of all types became a national priority. Generally, the transportation fuel types considered "alternate" are biodiesel, electricity, ethanol, methanol, natural gas and propane.

The thrust of alternative fuel efforts has been on the fuels and additives to be used in the carbon monoxide and ozone nonattainment areas of the country which are required to use cleaner-burning transportation fuels.

Nebraska's Quest for Cleaner Transportation Fuels

At the state level, the Governor's 1992 *Energy Action Plan* and the 26-member Alternate Fuels Committee serve as the guiding forces in increasing the use of cleaner-burning transportation fuels and reducing the state's overall dependence on petroleum-based fuels.

During the reporting period, members of the Committee participated in a September 1996 Clean Cities meeting in Omaha. Clean Cities is a voluntary,

locally-based government and industry partnership, coordinated by the U.S. Department of Energy, to expand the use of alternatives to gasoline and diesel fuel.

Nebraska Ethanol Production Developments

In 1996, the state retained its position as the number three ethanol producer in the nation. An estimated 200 million bushels of the state's grain crops are used to produce ethanol and other by-products. A total of seven operating plants are capable of producing up to 285 million gallons of ethanol annually, about 18 percent of all ethanol produced in America. The plants employ 735 Nebraskans directly and an estimated 3,600 others indirectly — a total of 4,325 jobs.

85 Percent Ethanol Efforts in Nebraska

As part of a Governors' Ethanol Coalition effort (see related section on page 13), the Energy Office directly and indirectly coordinated efforts to increase the use of 85 percent ethanol as an alternate fuel both inside the state and across the nation:

- ◆ The agency coordinated the design and production of promotional materials featuring the 1997 85 percent ethanol Ford Taurus. Thirteen Coalition states distributed more than 120,000 brochures. Ford Motor Company agreed to pay the \$19,186 cost.
- ◆ The E85 percent ethanol coordinator hired in the previous reporting period continued to perform activities in the state in 1996-1997. The coordinator is responsible for some Clean Cities organizational activities as well as securing locations for public 85 percent ethanol stations in Nebraska. The second public E85 station in the state opened in Lincoln in the fall of 1996.

The Energy Office, under contract, paid \$12,100 in 1996-1997 for the work performed. A federal Western Regional Biomass Energy Program grant of \$10,000 and unspent funds from a \$20,000 U.S. Department of Energy Clean Cities grant.

Governors' Ethanol Coalition

Governor Nelson founded the Governors' Ethanol Coalition in September 1991. By 1997, 20 states and one territory were members of the ethanol policy and promotion group as well as representatives from Brazil and Sweden. The goals of the organization are to increase the use of ethanol, to decrease the nation's dependence on imported energy resources, improve the environment and stimulate the national economy.

The Energy Office director is one of the Governor's representatives on the Coalition and the agency continues to serve as the administrative headquarters of the group, as it has since 1991.

1996-1997 Activities

During the reporting period, the Coalition undertook activities in several areas:

- ◆ The National Ethanol Research Institute, operated under contract by the Consortium for Plant Biotechnology Research, selected two research projects for expanding ethanol markets. The projects are funded by a \$250,000 U.S. Department of Energy grant received in 1994-1995.
 - The first project, by a University of Iowa professor, explores the conversion of ethanol to hydrogen.
 - The second project, by a University of Missouri-Columbia professor, tests the economic feasibility of converting trees into ethanol.
- ◆ Continued to publish the quarterly *Ethanol Alert* under a \$10,000 contract to a national trade association.

Natural Gas Technical Assistance

About 30 percent of the state's natural gas consumers receive their service from one of 14 municipally-owned natural gas utilities. The remaining 70 percent receive natural gas from one of four investor-owned natural gas utilities — KN Energy, Midwest Gas, Northwestern Public Service and Peoples Natural Gas Company.

One town in Nebraska may be unique in the entire country and provide a glimpse into the world of tomorrow's natural gas service. Kearney has granted franchises to two different investor-owned natural gas utilities to provide service to the town's residents. At this time, choice of service is only available to some larger natural gas customers.

Natural gas is imported into the state to the investor-owned and municipally-owned utilities primarily through major pipelines operated by Northern Natural Gas Company and KN Energy.

Municipal Natural Gas Regulation Act

Nebraska is one of only two states in the nation to regulate investor-owned natural gas suppliers at the local level. Village boards and city councils review rate requests under the state's *Municipal Natural Gas Regulation Act*. The Energy Office administers the Municipal Natural Gas Regulation Revolving Loan Fund, created by the Act to provide interim financing of rate regulation. The agency also provides technical assistance to communities as they perform their regulatory duties.

The 1996 Legislature amended the Act to allow for consolidation and use of videoconferencing of the rate area hearing in filings involving more than one rate area.

Revolving Loan Fund

The Municipal Natural Gas Regulation Revolving Loan Fund was initially capitalized with \$350,000 in oil and natural gas severance tax revenues. The fund finances local review of utility-initiated general rate requests and judicial review, if necessary. Groups of communities borrow

from the fund to finance the rate studies and the fund is replenished in the same amount by the utilities, which in turn recover the cost of regulation from the ratepayers.

Regulations governing the loan fund were adopted and took effect in 1987.

1996-1997 Loan Fund Activities

In 1996-1997, four rate areas — groups of communities — served by three different investor-owned utilities were involved in ratesetting activities financed with \$337,043 from the Municipal Natural Gas Regulation Revolving Loan Fund:

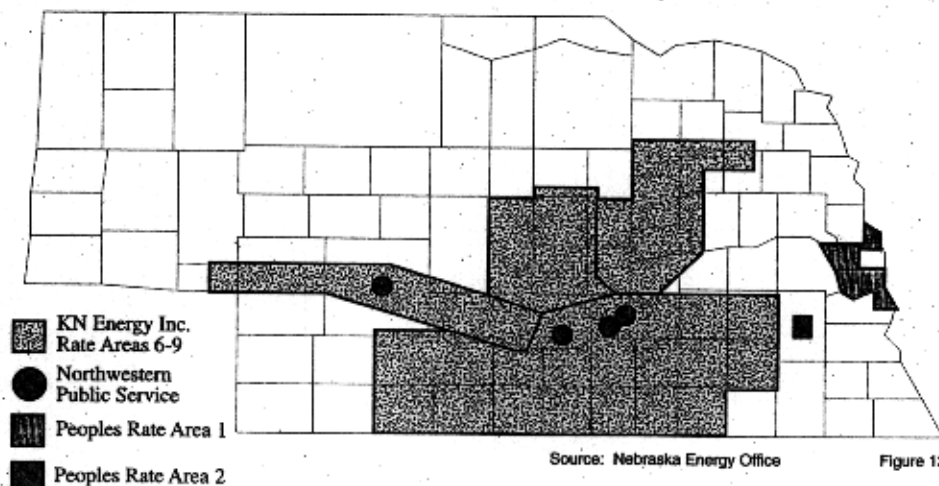
- ◆ Peoples Natural Gas Company filed for general rate increases in two of the utility's three rate areas during this and the previous reporting period. The towns included Peoples' service territories of suburban Omaha and in Lincoln.
 - The city of Lincoln reached a negotiated settlement with the utility and received loan approval to spend up to \$91,500 to analyze the rate request.
 - The 11 suburban Omaha towns in Rate Area 1 did not reach agreement with the utility and filed suit in Lancaster County District Court. The cost of regulation for this rate area was \$65,000 for the area hearing phase (this loan was repaid by the utility during this reporting period); a \$56,000 loan has been approved for the District Court phase; and a \$10,000 loan has been approved for the Supreme Court phase.
- ◆ The 1990 rate request by KN Energy of central Nebraska communities in the utility's rate areas 6 through 9 was resolved in the utility's favor by the state Supreme Court. The utility repaid the cost of the appeal, \$63,349, during this reporting period.
- ◆ A negotiated settlement of the Northwestern Public Service rate request in four central Nebraska communities was reached in the previous reporting period. In 1996-1997, the utility repaid \$51,194, the cost of regulation, to the loan fund.

Technical Assistance

Throughout the reporting period, the Energy Office provided assistance to municipal officials during all phases of the regulatory process as mandated by statute.

Typical kinds of assistance include organizing and providing support services for rate area committees, publishing periodic issues of the *Natural Gas Rate Regulation Update* in each utility's service area, issuing requests for proposals for professional services, providing informational broadcasts and responding to specific inquiries regarding the regulatory process.

Areas Receiving or Appealing Natural Gas Rate Requests in 1996-97



Grants

During the current reporting period, the Energy Office received several new one-time or project-specific grants for use by the agency or for regional groups. These new grants, totaling \$911,700 in 1996-1997, are detailed here and in other sections as indicated.

Nebraska Department of Environmental Quality

In 1996-1997, the Energy Office received a \$250,000 Waste Reduction and Recycling Incentive Grant from the state's Department of Environmental Quality. The agency was one of 35 recipients receiving \$1.7 million in grants. The grants are funded by a \$25 fee on retail businesses.

For more information about the activities financed by this grant, see page 5, the section on Dollar and Energy Saving Loans.

U.S. Department of Energy

Clean Cities

The agency received a \$20,000 grant from the U.S. Department of Energy to host a regional Clean Cities town hall meeting in Omaha in September 1996. Clean Cities is a locally-based, voluntary government and industry partnership to expand the use of alternatives to gasoline and diesel fuel. Two grants totaling \$10,000 from two of the five regional biomass energy programs were also used to underwrite the costs of the town hall meeting.

Governors' Ethanol Coalition

Two hundred thousand dollars were received from the Federal Department of Energy in support of the Governors' Ethanol Coalition during the reporting period. See page 12 for more information on the Coalition's activities.

Great Lakes Regional Biomass Energy Program

In 1996-1997, the Energy Office received a \$5,000 grant to pay for a portion of the costs of hosting a regional Clean Cities conference in Omaha. For more information on this activity, see Clean Cities above and Ethanol and Other Alternate Fuels, page 12.

National Industrial Competitiveness through Energy, Environment and Economics

In 1994-1995, the agency received a \$1,250 grant for the Energy Office to promote partnerships that develop and demonstrate advances in energy efficiency and clean production technologies to industries and utilities in the state.

During the reporting period, the agency promoted the federal partnerships via mailings and on-site visits to selected manufacturers in the state. A total of \$804 was spent in 1996-1997. By June 30, 1997, \$353 remained unspent from this activity.

State Energy Program Special Projects Grants

In 1996-1997, the Energy Office received a total of \$370,000 in competitive grants from the U.S. Department of Energy for multi-year efforts to expand the agency's work with commercial and industrial businesses as well as multi-family housing groups and public building operators to increase energy efficiency.

For more information about the Climate Wise, Federal Energy Management Program and Rebuild Nebraska grants, see page 3.

Sustainable Technology Energy Partnership Pilot Program

In 1996, the Energy Office received a \$74,428 Sustainable Technology Energy Partnership Pilot Program grant from the National Renewable Energy Laboratory to

provide partial funding for monitoring wind speed and direction as well as solar energy at eight locations in Nebraska.

The Nebraska Power Association, under contract to the agency, is the project coordinator for the wind study. As of June 30, 1997, \$34,475 of these funds had been spent by the Power Association. For more about this project, see page 11.

Western Regional Biomass Energy Program

The Western Regional Biomass Energy Program is one of five regional projects across the country designed to develop short-term, cost-effective uses for biomass resources. Biomass is renewable organic matter, such as forest residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operations residues, aquatic plants and municipal wastes. Nebraska's region is administered by the Western Area Power Administration.

Two agency representatives serve on a program advisory board, which directs the regional program as well as specific projects.

During the 1996-1997 reporting period, three new grants totaling \$29,000 were received by the state's Energy Office from the Western Regional Biomass Energy Program:

- ◆ Fourteen thousand dollars of a \$16,700 grant was used to pay the agency's portion of the additional cost of a soydiesel — also called biodiesel — heavy duty truck demonstration with the state's Department of Roads. The third financial partner in the project is the state's Soybean Board. This project is to end in late 1997.
- ◆ A \$15,000 grant was used to pay for the services of a contractor who assisted the agency in furthering Clean City activities in Omaha and securing locations for public 85 percent ethanol service stations in the state's two largest cities. By June 30, 1997, all funds from this grant had been spent.

- ◆ A \$5,000 grant was used to underwrite the cost of a regional Clean Cities conference held in Omaha in September. For more information on this activity, see Clean Cities on the previous page and Ethanol and Other Alternate Fuels, page 10.
- ◆ In 1994-1995, the agency received a \$6,000 grant to provide a nationally broadcast conference on bioenergy resources to generate electricity. After the project concluded, the \$985 remaining was spent during the reporting period for expenses to attend a national biomass conference.

U.S. Environmental Protection Agency

In 1994-1995, the agency received a non-competitive grant of \$103,837 to develop a national training program on how to use student interns to perform lighting audits in institutional buildings under the EPA's Green Lights Program. When the training effort concluded, \$85,966 had been spent.

During the current reporting period, an additional \$7,480 of the grant funds were spent for technical assistance, staff salaries and acquiring energy auditing and computer equipment. The remaining \$10,391 of the grant will be spent during the 1997-1998 fiscal year.

Fiscal and Organizational Notes

Financial Review

The accompanying figures illustrate the Energy Office's income and expenses from July 1, 1996, through June 30, 1997, which amounted to \$14,825,423 and includes federal, state and oil overcharge funds.

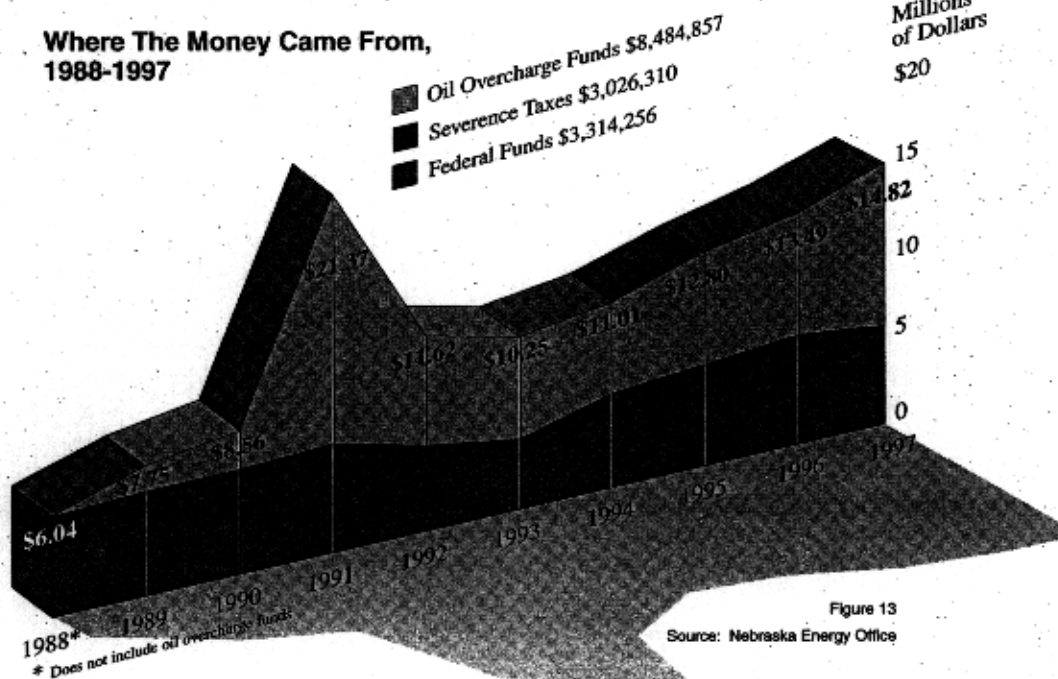
Approximately 57 percent of the agency's funding came from oil overcharge funds, an eight percent increase from the previous year.

Oil overcharge funds increased by nearly 27 percent. State funds were virtually stable. The appearance of an increase in oil overcharge funds was, in fact, increased activity — loans being made and repaid.

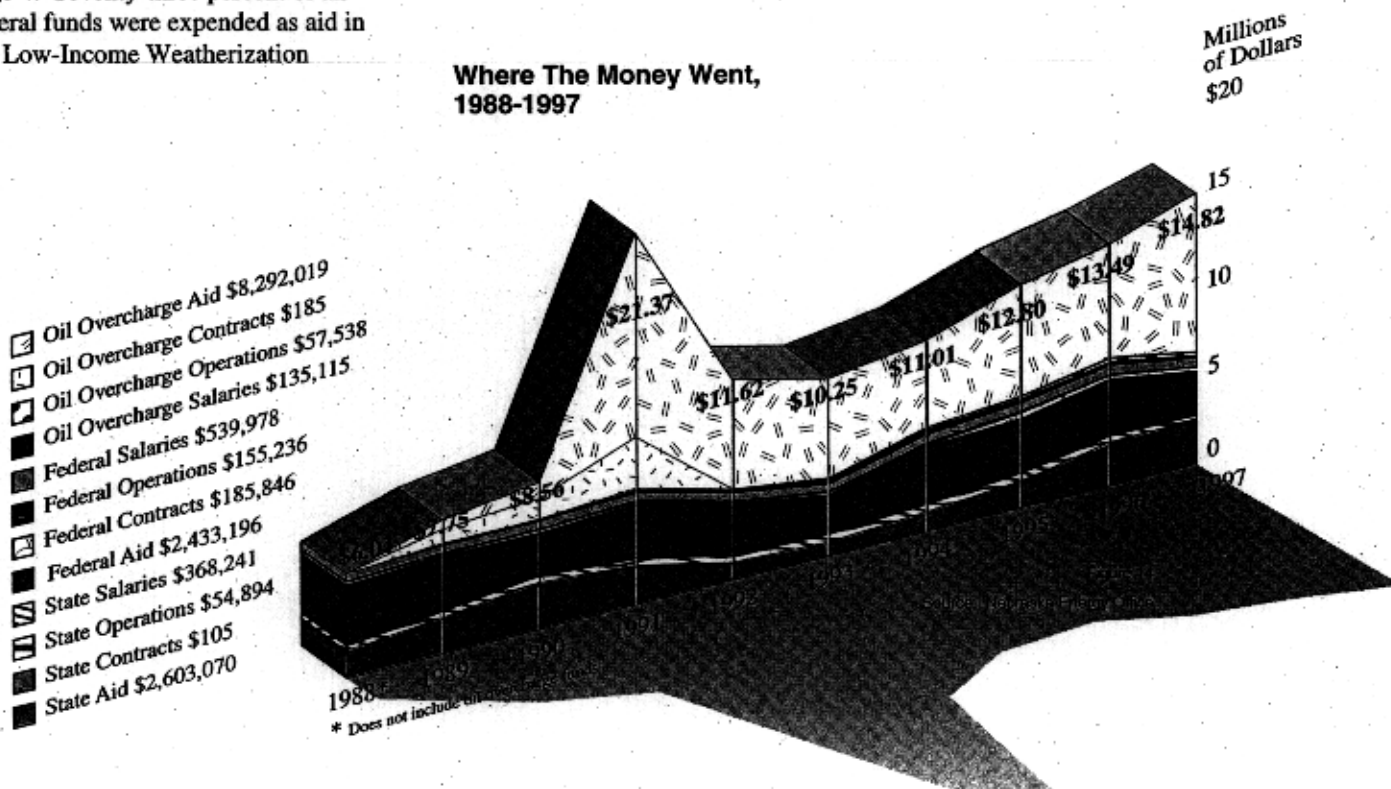
State funds came exclusively from severance taxes. No state general funds have been appropriated to the Energy Office since 1983.

Fifty-six percent of all expenditures were used for oil overcharge aid and contracted projects listed in the Oil Overcharge Funds section starting on page 4. Seventy-three percent of all federal funds were expended as aid in the Low-Income Weatherization

Where The Money Came From, 1988-1997



Where The Money Went, 1988-1997



Assistance Program. In excess of 86 percent of all state severance taxes were spent as aid under the School District Energy Efficiency Program. While the program ended in June 1996, the funding for several projects had been approved before the deadline and the funds encumbered and spent during this reporting period.

A full accounting of the Energy Office funds appears in figures 13 and 14.

Overall, the agency spent state, federal and oil overcharge funds in eight different ways. Aid, which makes up the largest

portion of the agency's expenditures, consists of money from the three sources which is received and passed on to delegate agencies or directly to beneficiaries such as schools, hospitals, small businesses, local governments and individuals. Money spent for operations pays travel, telephone, computers, salaries and other office expenses.

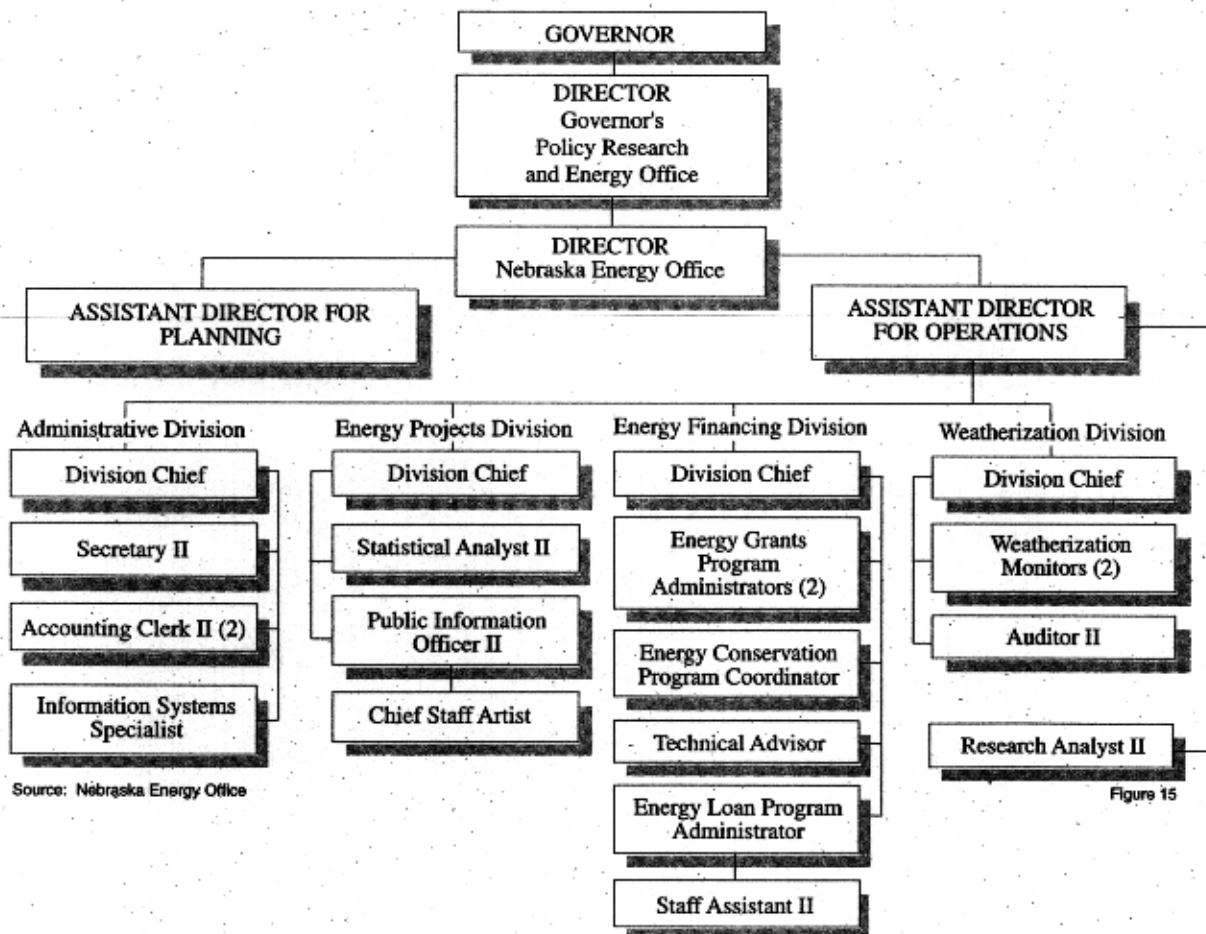
A more detailed accounting of the oil overcharge funds appears on pages 2 and 3.

Organization

The Energy Office was created in November 1973 as the Fuel Allocations Office, a division of the Nebraska Department of Revenue. The agency had independent status from 1977 to January 1987, when it became, by Executive Order of the Governor, a division of the Governor's Policy Research Office.

The organizational chart below (figure 15) shows the functional structure of the Energy Office during the reporting period.

Nebraska Energy Office Organization



Source: Nebraska Energy Office

Figure 15

Issues and Trends

Introduction

At least annually, the Energy Office is required to "identify emerging trends related to energy supply, demand and conservation and to specify the level of statewide energy need within the following sectors: agricultural, commercial, residential, industrial, transportation, utilities, [and] government..." This section addresses those requirements as well as chronicles international, national and state trends and issues.

[Editorial Note: Due to circumstances beyond the Energy Office's control, not all energy production, cost and consumption information for 1996 was available by the deadline for publication of this report. However, the estimated 1995 figures have been adjusted where possible based on the latest Energy Information Administration data.]

Energy Costs and Consumption

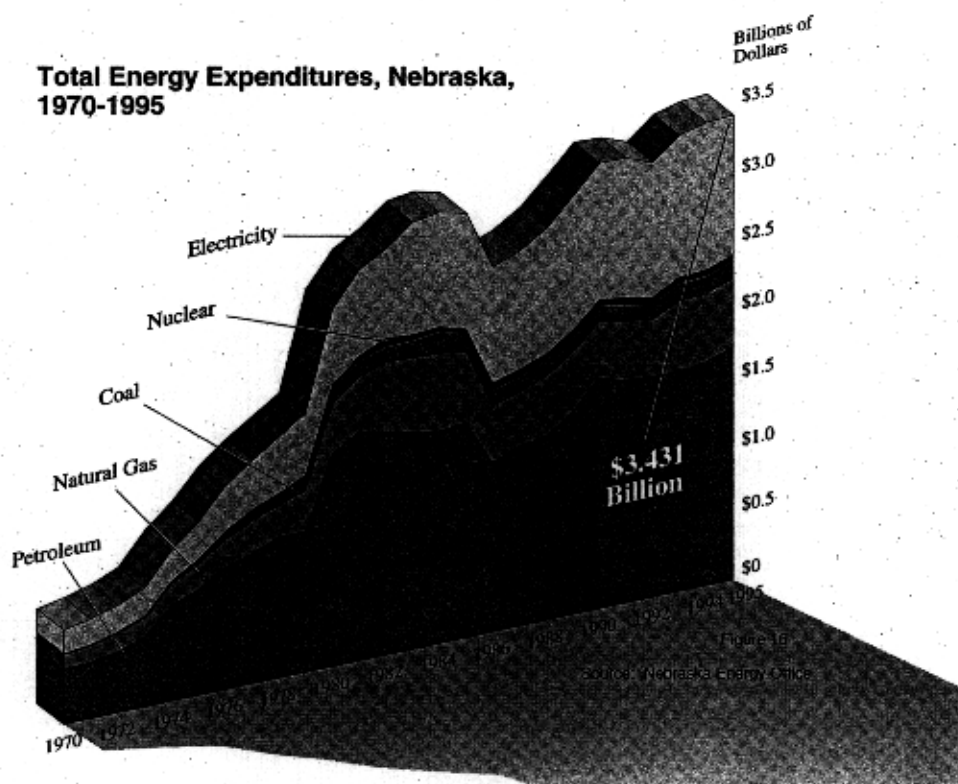
Nebraska's total energy bill topped \$3 billion — exactly \$3.43 billion in 1995. Again, a new all-time, record high was established, surpassing 1994's total of \$3.232 billion.

The cost of the state's petroleum dependence remained unchanged. Just over half of all energy expenditures — 52.7 percent in 1995 — was for petroleum and its refined products used in the state. Nebraska's petroleum bill for 1995 totaled \$1.809 billion.

Energy consumption, which rose in 1993 and 1994, again rose in 1995 to an all-time record of 580 trillion British thermal units.

All sectors — residential, commercial, industrial (including agriculture) and transportation — recorded increases in energy consumption in 1995. The transportation and industrial sectors recorded the largest percentage increases, 6.2 percent and 3.7 percent respectively. Both sectors — transportation at 168 trillion British thermal units and industrial

Total Energy Expenditures, Nebraska, 1970-1995



at 160 trillion British thermal units — neared all-time record highs set during the second oil-shock years of 1975-1979. Contributing factors for the increases were the strong state economy as well as new factors influencing the transportation sector.

While energy use in the commercial sector set a record at 120 trillion British thermal units, the increase was slightly less than three trillion units more than 1994.

Residential use in 1995 increased to 133 trillion British thermal units, a 2.2 percent rise and a new all-time record.

One of the most dramatic changes in 1995 was the amount of electricity sold to users outside Nebraska. Sales registered more than a four-fold increase from 1994 to 7.13 trillion British thermal units, surpassing the record set in 1992. The anomaly in interstate sales is attributable to Cooper Nuclear Station in Brownville returning to service.

Separate energy use and production information is provided for electric producers in the Electricity section of the *Annual Report*.

Electricity

State Production and Consumption

In 1995, energy use by the state's electric utilities was 271 trillion British thermal units, an increase of 12.9 percent from the 1994 total of 236.3 trillion British thermal units, and a new record. Nebraskans paid \$1.09 billion for the electricity they used in 1995, an all-time record high.

Electricity produced in the state is generated from coal, nuclear, hydroelectric, natural gas, and petroleum. The first three fuel sources represent the vast majority of electricity resources used in the state. Natural gas and petroleum for the production of electricity are used primarily for smaller peaking units that generally operate in the summer.

Specifically, electrical production in 1995 increased by 3,332 million kilowatthours from 1994 to 25,279 million kilowatthours, a new record. Electricity from coal, at

16,080 million kilowatthours, accounted for 63.6 percent of the production. Nuclear power, at 7,485 million kilowatthours, accounted for 29.6 percent. Electricity from hydropower units, at 1,426 million kilowatthours, accounted for 5.6 percent of all power production. Natural gas and petroleum accounted for just over one percent. A new source of fuel — shredded tires — accounted for just a fraction of one-tenth of one percent, just slightly less than petroleum used for electricity production.

National Trends

The trend of utility deregulation continues to focus on electric power companies. As with the deregulation that occurred in the natural gas industry, the movement to "unbundle" the electric utility system is coming from two directions — the Federal Energy Regulatory Commission at the national level and state-level public utility commissions. Unbundling would separate a utility's power production, transmission and local distribution systems.

Initially, deregulation would allow the largest electricity users to directly purchase the electricity they need from any producer and ship it over the lines owned by the utilities.

Deregulation is occurring first in the areas where electric rates are highest, particular New England and California.

Electric utilities in the state are watching national deregulation developments very closely. In 1997, the state's legislature began a multi-year study of deregulation effects on the state's public power system. However, the relatively low cost of electricity in the state may forestall significant changes to the traditional utility structure in Nebraska.

Three issues are linked to electric utility deregulation: how to deal with costs such as power plant construction incurred earlier by utilities for which a rate of return has been guaranteed, minimizing rate shifts from one customer group to another such as from industry to residential customers and how rate competition could undermine energy efficiency and renewable energy growth.

"There is no telling what the new standards might require in the Midlands, officials said. Douglas, Cass, Buffalo, Dawson, Lancaster and Otoe Counties in Nebraska might no longer be in compliance if the rules took effect. Utility officials, including those at Nebraska Public Power District, said they had no way to assess the impact until the Nebraska Department of Environmental Quality did additional air quality testing.

"The air quality in many cities has improved in recent years. But it still isn't as good as it should be. Careful study and balancing must continue to be part of the nation's clean air effort. But Americans should also remember that polluted air has shortened too many lives and added too much to the cost of health care."

Editorial, *Omaha World-Herald*
December 12, 1996

Other National Issues of Note

◆ **Outages.** In July and August 1996, two massive electrical outages in the western United States brought home both the fragility of the system as well as its interconnectivity: when lines fail in a connected electrical grid, customers hundreds and thousands of miles away from the original outage can also lose power. The two unrelated outages also raised concerns about system reliability and maintenance in an industry beginning down the path of deregulation.

◆ **Air Quality.** The Environmental Protection Agency tightened *Clean Air Act* air quality standards for smog and soot in June 1997. During the lengthy comment period on the proposed new rules, Nebraska farmers and utilities expressed concern over how the new standards might affect their operations.

In April 1997, the EPA removed Nebraska from meeting the new tighter standards for ozone. The two utilities that operate coal plants in Hallam, Nebraska City and Sutherland estimated that compliance with the new standards would cost \$50-\$100 million in new equipment. How the new higher standards for particulates could affect Nebraska remained unclear: a five year monitoring process will be necessary before Nebraskans will know if pollution control actions will need to be taken.

State Issues

The issues confronting the state's utilities generally parallel those in other regions of the country; however, some are truly local in nature.

Deregulation Issues

Because of Nebraska's unique position as being the only state where all the electric utilities are owned by the customers they serve, utilities in Nebraska are skeptically viewing national deregulation efforts targeted at investor-owned electric suppliers in denser population areas where electric costs are considerably higher.

"...We Nebraskans could be in for a disappointment in the future as our publicly operated electrical system adapts to the new deregulated environment.

"Public power has been good for Nebraska. If it had not been for the aggressive construction of transmission and distribution systems throughout our state, and the thoughtful investment of consumers' dollars in efficient generating facilities, our state would bear little resemblance to today's diverse, prosperous Nebraska."

Editorial, *Kearney Hub*
December 18, 1996

The road to electric deregulation is traveling along two parallel, but distinct paths: national and state-level. Numerous Nebraska utility executives have expressed concern that actions mandated by Congress could harm the state's unique power system and cause costs to their consumer-owners to rise.

During the reporting period, little legislative progress at the national level was made despite numerous hearings. More than a dozen bills are being considered by both Houses of Congress. Some of the bills called for complete deregulation down to the customer level by 2000. There is growing belief that Congress may only be able to impact minor deregulatory issues since there is little consensus in many areas.

Deregulation of the electric industry is different from earlier deregulation efforts because 25 percent of the nation's electric customers are served by publicly-owned systems. In past deregulation efforts, public ownership was marginal or nonexistent.

It is conceivable that the states taking deregulation steps early will pre-empt Congressional action.

In response to deregulation activities in other states, the Nebraska Unicameral and the state's electric utility industry began a three-year, \$450,000 state-funded study of the options available to the utilities in a deregulated environment. The first phase of the study, an historical and current view of the state's electric providers, is expected to be completed in late 1997. The second phase will identify the options as well as what possible legislative action may be required. All parties participating in the study have indicated that even though public ownership of the systems will be examined, potential sale of the systems to private investors will not be an identified option.

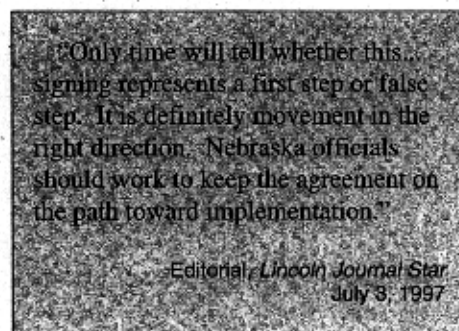
Kingsley Dam Relicensing

The 13-year struggle to obtain a new 30-year renewal of the hydropower dam at Lake McConaughy, north of Ogallala, continued. As of September 1996, more than \$30 million had been spent on license

renewal issues according to the two utilities that operate hydropower facilities on the river.

The Federal Energy Regulatory Commission license to operate the hydropower facility was originally issued in 1941 and expired in 1987. Since that time, only annual operating licenses have been issued pending the resolution of seemingly conflicting issues — irrigation, power generation, recreation, fish and wildlife welfare, municipal interests and flood control.

Any solution is further complicated because the Platte courses through Wyoming and Colorado and actions taken there can have impacts downstream in Nebraska. Since 1994, governors from the three states have had discussions on resolving water and environmental issues and the federal government wants the states' issues resolved before a new license is issued.



By June 1997, a long-term license renewal for the hydropower facilities had not been issued.

A major step in the relicensing process was taken in June 1997: three years of discussions culminated in the governors of Colorado, Nebraska and Wyoming and the Interior Secretary signing an agreement to divide responsibility for endangered species on the Platte River. The federal government has required addressing endangered species issues as a condition to

relicensing of the Kingsley hydropower plant and other structures on the Platte River. The cost of the agreement is \$75 million, equally shared by the states and federal government. Nebraska's cost is estimated at \$15 million.

Other State Issues of Note

- ◆ **Western Area Power Administration Sale.** In 1997, the proponents of the sale of some or all of the federal hydropower marketing administration, including Western Area Power Administration that provides about 15 percent of Nebraska's electricity, conceded that Congress would not approve the sale of these federal assets.
- ◆ **Mergers.** Mirroring utility mergers on the national scene, several local or regional electrics merged or considered combining: Lincoln Electric System and Norris Public Power District in Beatrice briefly considered studying a merger of the two utilities, but Norris declined to participate in the endeavor; Southwest Public Power District in Palisade and McCook Public Power District also considered a possible merger during the reporting period; Northeast Nebraska Rural Power District in Emerson and Wayne County Public Power District approved a merger in December 1996 and agreed to operate as the Northeast Nebraska Public Power District beginning in January 1998.
- ◆ **Rates.** Nebraskans continued to benefit from low electric rates: According to the U. S. Department of Energy, the average cost of electricity for Nebraskans was the seventh lowest in the nation in 1996, an average of 5.2 cents per kilowatt-hour. Lincoln Electric System released an audit of average residential, commercial and industrial electric rates showing that Lincoln's rates were within the lowest ten percent in the nation.
- ◆ **Pauline-Moore Power Line.** Despite a judicial finding that Nebraska Public Power District's Board of Directors violated public meetings laws, the judge refused to stop the utility from using the 96-mile high voltage power line. The utility had completed construction of the power line five months before the court decision.

◆ **New Generating Plants.** Lincoln Electric System's plan to join other utilities in the region to construct a second electric coal generating station near St. Joseph, Missouri was delayed and the plant will likely not be operational until 2004, three years later than planned. The city-owned utility estimates an additional 150 megawatts will be need by 2004.

◆ **Retirement.** Lincoln Electric System's only administrator since the utility was formed in 1971, Walt Canney, retired in 1997.

Nuclear Power and Nuclear Waste

State Production and Consumption

Nuclear generated electricity in the state in 1995 reversed a two-year decline, increasing to 80 trillion British thermal units. Only 67.8 trillion British thermal units were produced from nuclear power in 1994 due to the prolonged shutdown of Nebraska Public Power District's Cooper station near Brownville. The facility shutdown in May 1993, but did not resume full power until February 1995.

Nebraskans paid an estimated \$52 million in 1995 for the nuclear generated electricity used in the state, up from \$49 million in 1994.

Only 13.4 percent of all energy used in the state in 1995 came from nuclear power, an increase of more than one percent from 1994.

In comparison, an estimated 18-19 percent of all electricity used in the world in 1996 came from nuclear power, about the same as the previous year.

National Trends

While the United States has the greatest nuclear capacity in the world, future capacity is expected to decrease over the next decade. By 2010, America's nuclear capacity will decline from 99 gigawatts to about 93 gigawatts as older units are deactivated. A gigawatt is one million kilowatts. Premature closing of some nuclear units because of deregulation could accelerate this trend.

The nuclear power industry has stalled in America because of three factors: high operating and construction costs relative to other fuel sources and unsolved nuclear waste disposal. No new nuclear power plants are planned.

Other highlights during the period:

◆ With the era of deregulation dawning in states with high-priced electricity, the utility owning the nation's oldest operating nuclear power plant, Northeast Utilities, said the utility was considering closing the plant because it could not compete with less expensive types of energy.

◆ Many utilities with debt, primarily as a result of constructing nuclear power plants, began to question how those debts could be paid in a deregulated environment and who would pay them. According to the *New York Times*, these debts total an estimated \$70 billion and do not include costs associated with closing the plants. As states implement deregulation plans, some states that have allowed partial or full recovery of "stranded costs" such as nuclear power plants have been sued by consumer groups.

◆ The future of the planned international fusion

reactor, a multi-nation research project that included the United States, was likely killed when the U.S. Department of Energy indicated America would only supply five percent of the cost of the project. The reactor, if built, would likely be in Japan which agreed to pay half the cost of the project. However, European nations, as a group, only agreed to match the contribution by America.

◆ Japan, which has the most advanced nuclear power program in the world, was jolted in March 1997 by a second accident nuclear accident in 18 months. While the incident was minor by radioactive and environmental measurements, it still ranked as Japan's worst nuclear accident. A declining level of support for nuclear power may doom Japan's aggressive nuclear power effort.

Nebraska Nuclear Facilities

The state has two nuclear power generating facilities — Fort Calhoun Nuclear Station operated by Omaha Public Power District and Cooper Nuclear Station near Brownville operated by Nebraska Public Power District. Fort Calhoun is one of the older commercial nuclear facilities still operating in the nation.

State Trends

No new nuclear facilities are planned for construction by utilities in the state due to cost inefficiencies and unsolved storage issues for low- and high-level waste.

Highlights during the reporting period:

◆ Based on 1993-1995 information, the Critical Mass Energy Project named the Cooper Nuclear Station as one of the 25 plants on its "nuclear lemon" list in October 1996. The 23-year old station experienced operational problems during that period of time. The utility that operated the plant contended the plant

Nebraska Nuclear Power Plant Locations by County, 1997

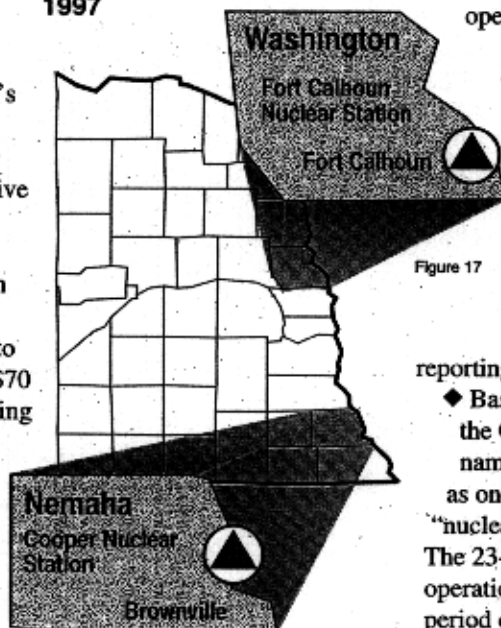


Figure 17

Source: Nebraska Energy Office

was safe and the problems that caused the lengthy shutdown had been resolved. In February 1997, the Nuclear Regulatory Commission noted that Cooper staff had improved its operation of the station and warranted a "good" rating.

- ◆ The utility that operates the Fort Calhoun plant was cited in July 1996 for five violations related to air sampling by the Regulatory Commission. The utility contested one of the violations.

Nuclear Waste

The majority of nuclear waste in the state is produced by the two nuclear power stations. For storage purposes, radioactive material is classified as high- or low-level waste depending on the length of time the waste remains radioactive.

High-level waste is spent nuclear fuel and has primarily been stored on site at the nuclear power plants awaiting construction of a temporary or permanent repository. Fort Calhoun has storage capacity until 2007. The Cooper station expects to exhaust on-site storage by 2002-2004.

Permanent High-Level Waste

The *Nuclear Waste Policy Act*, passed by Congress in 1982, set forth the storage options for the radioactive waste:

- ◆ Defense Department radioactive waste would generally be segregated from commercial radioactive waste and stored at the Waste Isolation Pilot Plant in New Mexico.
- ◆ A permanent storage facility would become the final repository for spent nuclear fuel from commercial reactors. By 1998, the U.S. Department of Energy was supposed to start picking up the waste from nuclear reactors and move it to the permanent site. In 1987, Congress selected Yucca Mountain, Nevada, as the most likely site, if found suitable, for spent nuclear fuel from the nation's 109 reactors.

- ◆ If needed, a temporary radioactive waste storage facility, called monitored retrievable storage, would be located at an undetermined site.

To finance the Yucca Mountain site, utilities with nuclear generators have been paying one-tenth of a cent per kilowatt-hour produced by the reactors. As of mid-1996, more than \$140 million has been paid by Nebraskans into the nuclear waste fund.

Waste Isolation Pilot Plant

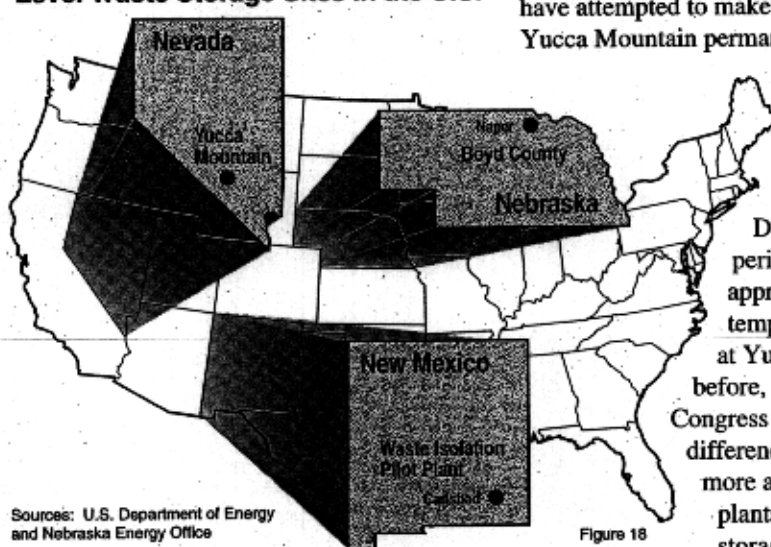
The furthest developed facility, the Waste Isolation Pilot Plant, was begun in 1983 near Carlsbad, New Mexico. Designed to store radioactive wastes resulting from the production of nuclear weapons, it is also a test of the use of prehistoric salt beds to entomb radioactive waste. This waste will remain deadly for 240,000 years.

The \$2 billion, 20-year project is expected to open in May 1998 and begin accepting 50 years of nuclear bomb wastes. After an estimated one-half million barrels of waste are stored in the facility, around 2033, the plant will be permanently sealed.

Yucca Mountain

Since the selection of Yucca Mountain, the federal energy agency has faced both technical problems and local opposition. While site testing continues, the revised operational date of 2010 may again be postponed. More than \$3 billion has been spent to date evaluating the proposed site.

Proposed Nuclear High- and Low-Level Waste Storage Sites in the U.S.



Sources: U.S. Department of Energy and Nebraska Energy Office

Since 1995, both houses of Congress have attempted to make the selection of Yucca Mountain permanent. However, the

opposition by Nevada, as well as others, has prevented this from happening.

During the reporting period, the Senate approved building a temporary storage site at Yucca Mountain. As before, the two houses of Congress could not reconcile differences on the issue. As more and more nuclear plants exhaust on-site storage, the issue of

temporary storage will become one of greater concern.

In July 1994, the U.S. Department of Energy was challenged in two separate lawsuits to provide a storage site by 1998, the original operational date for permanent storage. Fourteen investor utilities filed one lawsuit, and 27 public agencies filed the second legal action. Nebraska joined the public agency lawsuit on behalf of the state's ratepayers who had contributed to the construction fund for the storage facility. During the reporting period, the U.S. Circuit Court of Appeals declared that the U.S. Department of Energy must begin accepting waste in 1998. How the federal agency will accomplish this is unknown at this time.

In June 1997, scientists studying Yucca Mountain determined that rain from 40 years ago or less had seeped from the top of mountain to 800 feet below where nuclear waste storage has been proposed. Scientists also found evidence of rain that seeped into the

storage area 5,000 to 20,000 years ago. These new findings could further delay the selection process. The best estimate for opening the permanent storage facility at Yucca Mountain is 2013.

Monitored Retrievable Storage

Temporary storage of spent nuclear fuel was also listed as a possibility in the 1982 law if a permanent facility was not operational by 1998.

According to the Edison Electric Institute, an estimated 35 nuclear plants will exhaust their on-site storage of radioactive waste by 2007, including the two plants in Nebraska.

Action during the reporting period on this type of storage focused on not one, but three storage options: a government-operated facility, a private one operated by utilities and actions being taken individually by utilities that have exhausted on-site storage options.

A Native American tribe, the Skull Valley Band of Goshutes in Utah, has shown the most interest in developing temporary storage of nuclear wastes that is government-operated. According to the nation's nuclear waste negotiator, assessments of two possible sites at the Goshute reservation are being conducted.

In August 1996, the Senate approved the construction of an above-ground temporary storage facility for spent nuclear fuel at Yucca Mountain in Nevada. The bill called for the facility to open in 2002. At the end of the reporting period, action on the issue was still pending in the House of Representatives.

According to the Nuclear Regulatory Commission, five currently operating nuclear plants are storing waste outside the plant in temporary, concrete facilities and applications for similar storage units are pending from six more plants.

Transporting Nuclear Waste

Whether high-level waste is civilian or military, it must be moved from where it was produced to temporary or permanent storage sites. Because many nuclear facilities are east of Nebraska and likely storage areas are west of the state, rail lines and highways in Nebraska are probable corridors for shipments of radioactive waste. One nuclear group estimated that 15,000 truck or rail shipments would be needed over the next 30 years to move the waste from generators to storage sites. As many as 12,000 of those shipments could pass through Nebraska. According to the Nebraska State Patrol, currently only one or two shipments a month pass through the state.

In November 1996, a truck carrying nuclear weapons slid off and overturned on a icy highway near Valentine, resulting in the highway being closed for several hours. The cost of righting and towing the truck was \$47,000. As a result of the incident, Nebraska's governor raised notification and safety issues with the federal Department of Energy and at a regional meeting of state governors.

"Common sense seems to have been the missing ingredient in the chain of events that followed an accident last month in the Sandhills in which a semi-trailer truck carrying two nuclear warheads overturned."

Editorial, *Norfolk Daily News*
December 19, 1996

Permanent Low-Level Waste Storage

Nebraska belongs to one of nine regional or state compacts in the nation formed to develop storage facilities for low-level radioactive waste. Low-level waste is generally composed of clothing, filters, resins, tools and other items from nuclear power plants and hospitals. According to the U.S. Department of Energy, utilities generate more than 50 percent of the low-level waste. In Nebraska, it is estimated that utilities generate 90 percent of the low-level waste. Low-level waste remains radioactive for 90 days to 200 years, according to experts.

Boyd County Radioactive Waste Storage Facility and Related Issues

Since Boyd County, Nebraska, was selected in 1988 by its regional compact, the Central Interstate Low-Level Radioactive Waste Commission, and the developer, U.S. Ecology, the building of a low-level radioactive waste facility has progressed along a predetermined number of stages. The facility is now estimated to cost \$153 million, more than five times the original estimate of \$30 million. The facility, if built, is expected to be operational in 2000. As of January 1997, \$80 million had been spent on siting and licensing issues.

Until a regional facility is operational, the two Nebraska utilities store waste on site or send the waste to a facility in Barnwell, South Carolina. The South Carolina facility was briefly closed in 1995, but reopened in mid-1996 and is expected to remain open for seven or eight years.

The state's Department of Environmental Quality has indicated that its final review of the application to build a site in Boyd County should be completed by February 1998. Final license decisions could extend into 1999 or 2000.

In August 1996, a report was released that indicated low-level waste generated in the five compact states had dropped from 58,000+ cubic feet in 1990 to 12,000+ cubic feet in 1995. The report's authors indicated the financial stability of the project could be jeopardized because of the dramatic decline in waste volumes.

Throughout the reporting period, Nebraska Public Power District, one of the utilities financing the Nebraska site, considered and rejected a proposal to stop funding the project.

Also, the some Compact members and Nebraska disagreed over the pace of the license review.

Natural Gas

State Production and Consumption

After peaking in 1973 at more than 230 trillion British thermal units, Nebraska's natural gas consumption has plummeted by nearly half to 134.1 trillion British thermal units in 1996. The 7.3 percent rise in natural gas use over 1994 was due primarily to weather.

Natural gas expenditures in the state totaled an estimated \$507 million in 1995, still below the peak of \$567 million in 1984, and an increase of 1.4 percent from 1994.

A small amount of natural gas is mined in the state — less than two percent of that used in a year. A production surge that began in 1993, peaked in 1994 and declined in subsequent years. Natural gas production totaled 1.8 billion cubic feet in 1996, a decline of 18.9 percent from the nearly 2.2 billion cubic feet produced in 1995.

The all-time production low in Nebraska was in 1991 when 784 million cubic feet were mined. Most of the state's production is confined to seven counties in the Panhandle as shown in figure 19. More than 80 percent of all natural gas production in the state in 1996 came from Cheyenne County. Without any new natural gas field discoveries, the state's production levels should gradually decline over time. Given those prospects, nearly 100 percent of the state's natural gas needs in the future will come from imports.

National Trends

Two natural gas trends, reported in previous *Annual Reports*, continued: the spreading impacts of industry deregulation as a result of Federal Energy Regulatory Commission Order 636 and consolidation of the industry at all levels.

Order 636 fundamentally changed the natural gas utility industry. Securing supplies of natural gas became the responsibility of local utilities, with pipelines reverting to a common carrier

Nebraska Natural Gas Production by County, 1996

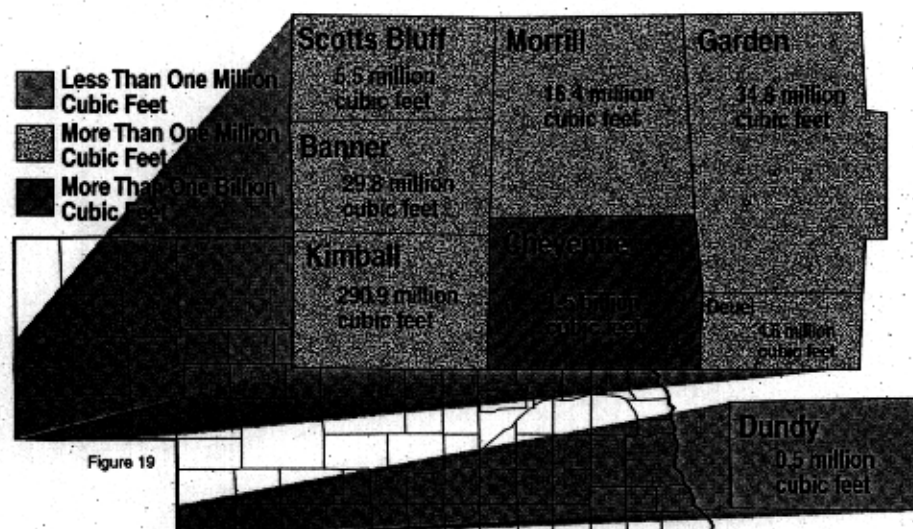


Figure 19

Source: Nebraska Oil Activity Summary, Nebraska Oil and Gas Conservation Commission, Sidney, Nebraska, Annual

Total 1996 Natural Gas Production 1.875 Billion Cubic Feet

status. The effect of the "unbundling" of services forced utilities to deal with every leg of the fuel's travel, from well-head to the customer's door. In the past, utilities relied on a regulated system to guarantee an adequate supply for their customers. With the regulatory safety nets stripped away, utilities must purchase the right amount of gas for the right customers. The new system will also cause a shift in costs according to the *Wall Street Journal*. Individual homeowners and small businesses will pay more, while big industrial customers will be able to negotiate for lower costs.

In October 1996, the *New York Times* reported that 12 states had opened part or all of their natural gas industries to competition and that 15 other states were considering all or partial deregulation. Regionally, Iowa has implemented residential deregulation and Wyoming has only allowed deregulation of in some areas of the state, but is considering state-wide deregulation of the industry. Generally, deregulation for commercial and industrial customers has preceded deregulation for residential customers in most states.

State Trends

The ramifications of Federal Energy Regulatory Commission Order 636 continued to resonate throughout the state, primarily for larger natural gas users. The state's largest users of natural gas have always been able to secure the gas they need from sources other than local providers.

Now, customer groups such as motels, restaurants or schools and local government groups are finding that by using a third party to secure natural gas supplies, they can save from five to 17 percent on their natural gas bills. For the first time, these smaller commercial operations are reaping the benefits that previously only larger firms could realize.

Even a number of smaller cities — Auburn, Fairbury and Wahoo — have become a "customer group" capable of supplying natural gas to larger users within their jurisdictions. This form of service is called "aggregation."

Aggregation of natural gas customers enveloped a new group of customers — residential ones — in Dakota City and South Sioux City. In December 1996, both towns became aggregators for all the customers in their respective towns, purchasing their gas from the Nebraska Public Gas Agency and not their local supplier, Mid America Energy. According to the Nebraska Natural Gas Agency, 32 towns in the state have become aggregators.

Another organization created by deregulation is Energy America, based in Lincoln. The company, formed in mid-1996, works with publicly-owned electric utilities and helps them enter the natural gas business in their areas.

A surge in the cost of natural gas became a heated issue in many communities during the winter of 1996-1997. Some towns voted to join a new organization, Alliance for Competitive Energy, which is affiliated with NMPP Energy. They hoped to find ways of reducing natural gas costs for their residents. Other towns such as Kimball and Oxford considered or voted to study taking over the investor-owned utility operating in their city. As the effects of FERC's deregulation continue to ripple across the state, the trends already cited could multiply.

Other Issues of Note

- ◆ **Acquisition of Systems.** In November 1996, voters in Auburn, Plattsmouth, Scribner and Wahoo voted on pursuing municipal acquisition of the local natural gas systems owned and operated by Peoples Natural Gas Company. Residents in Scribner and Wahoo voted to pursue acquisition of the systems. The next steps involve setting and negotiating a price for the natural gas systems.
- ◆ **Cold Temps and High Prices.** The winter of 1996-1997 brought 15-20 percent colder temperatures than normal and combined with unexpectedly high natural gas prices. According to the Energy Information Administration, natural gas prices in 1996 were substantially above 1995 rates throughout the entire year. In January, natural gas prices rose 4.8 percent, the biggest one month increase since recordkeeping began in 1952.
- ◆ **Natural Gas for Vehicles.** The state's largest city, Omaha, ended the year-long absence of a publicly-accessible natural gas pump for vehicles when Metropolitan Utilities District and Northern Natural Gas opened a station at Midlands Rental and Machinery.
- ◆ **Changing Utility Services.** KN Energy provided an early glimpse of what energy companies of the future may provide when it unveiled its "Simple Choice" effort in Nebraska. The utility is offering wireless modem service, satellite television, appliance sales and service, and long distance service as well as natural gas to its customers.

Petroleum

State Production and Consumption

Oil production in 1996 in the state dropped for the seventh consecutive year. The 3.54 million barrels pumped represented a 6.6 percent drop from 1995 and a new modern-day low. Figure 20 illustrates the state's oil production history since 1939.

The last time oil production was this low, 1952, the state's first oil well was just a teenager. Only 1,800 barrels were pumped in 1939, the year of the first oil strike in the state. By 1952, production had risen to 2.68 million barrels. None of the oil mined in the state has been refined in Nebraska since the last refinery closed in the 1980s.

Oil is produced in only 17 of the state's 93 counties and two counties, Hitchcock and Kimball, produced more than half of all the oil pumped in 1996. Figure 21 indicates the oil-producing counties in Nebraska.

It appears that even the use of advanced oil recovery technology, where practical, will not reverse the state's oil production decline.

An estimated 38.3 million barrels of oil were consumed in the state in 1995, down 2.3 percent from the year before. Less than ten percent of the oil used was produced in the state. As a result, more and more of the state's petroleum needs are being met by other states and countries.

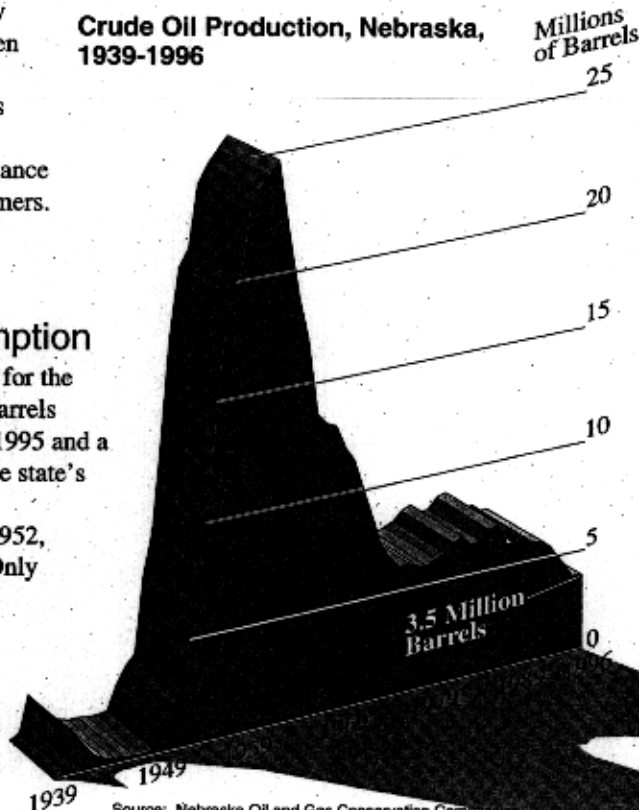
National Trends

The state's oil dependence is increasingly being paralleled by the nation. According to the American Petroleum Institute, oil imports into the United States rose by 1.7 percent to an all-time record of 53.1 percent of domestic demand set in 1996, and up from 51.8 percent in 1995. While oil production in the nation continues the long decline begun in 1954, it has generally stabilized. This stabilization, in part, has come from the technological advances now being used in older fields.

In fact, the conservation gains made in the 1970s that reduced the nation's reliance on imported oil from 45 to 32 percent by 1985 have been wiped out by the return to consumptive energy habits and growth in the economy.

Other equally sobering trends indicate that America will remain dependent on others to

Crude Oil Production, Nebraska, 1939-1996



Source: Nebraska Oil and Gas Conservation Commission

meet its petroleum needs into the foreseeable future:

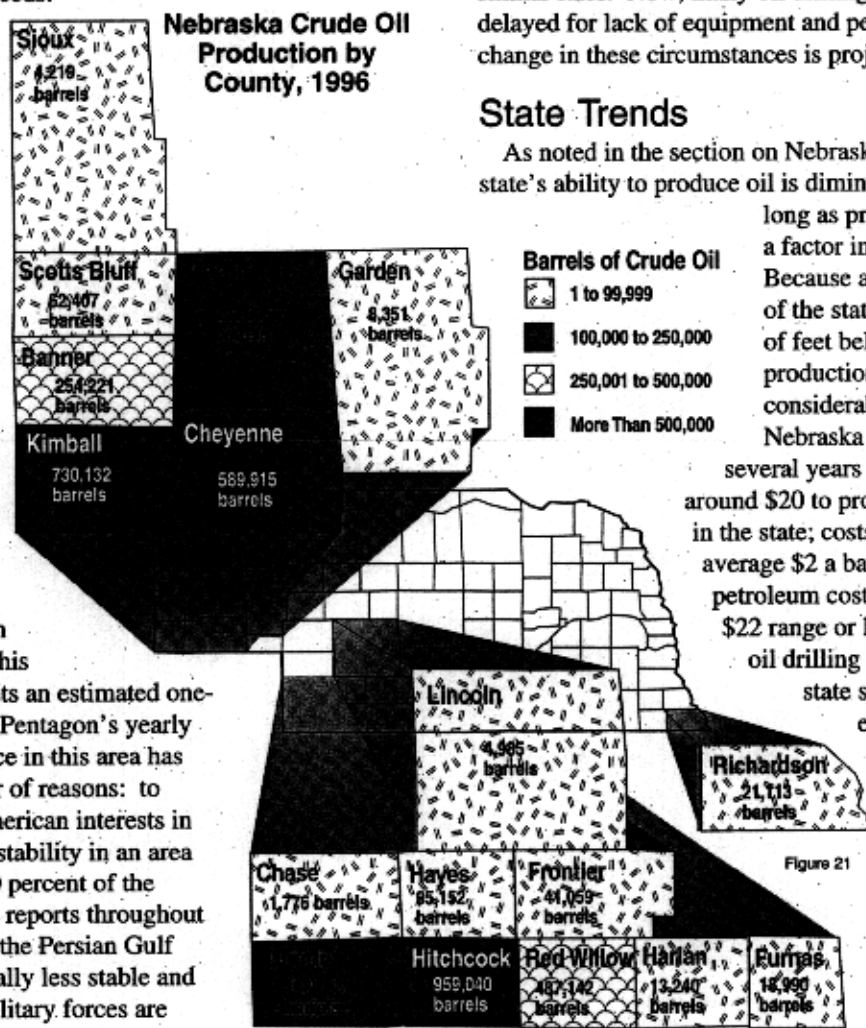
- ◆ According to the U.S. Department of Energy, through the first eight months of 1997, America's top four sources of petroleum products were: Venezuela, 17.2 percent; Canada, 14.7 percent; Saudi Arabia, 14.3 percent; and Mexico, 13.8 percent. A trend noted last year has increased in prominence and will likely continue: crude and refined oil products from Western Hemisphere countries will likely remain at half of all imports and, possibly, even increase. For the same period in 1997, Persian Gulf countries provided only 17.3 percent of the nation's petroleum needs.
- ◆ America's dependence on imported petroleum — both crude oil and refined products — will likely to continue to exceed half the nation's annual petroleum needs on a regular basis. The U.S. remains the world's largest oil consumer with annual consumption rates more than twice that in Germany, Britain and France.
- ◆ As noted in the last report, Americans should expect a sizeable primarily U.S. military force to remain stationed in the Persian Gulf region. This permanent deployment costs an estimated one-fifth, or \$50 billion, of the Pentagon's yearly budget. A military presence in this area has been justified for a number of reasons: to contain Iraq, to protect American interests in the region, and to provide stability in an area containing an estimated 70 percent of the world's oil supplies. News reports throughout the reporting period noted the Persian Gulf region is becoming politically less stable and the threats to American military forces are increasing.
- ◆ As noted before, price instability of oil products is likely to become a permanent fixture of the

world economy into the foreseeable future. The factors for this are many: imbalance of supply and demand; unseasonable weather patterns, refinery policies of "just-in-time" production of various petroleum products, reduced product inventories, and increasing diversity of the types of transportation fuels. Two of the aforementioned factors — colder than normal winter weather and heavier than anticipated demands for some petroleum products such as propane — were key players in the oil and petroleum price rises during the winter of 1996-1997.

- ◆ The return by American consumers to gas-guzzling vehicles, especially vans, trucks and sports utility vehicles, means the nation's petroleum dependence will not diminish in the near-term since Americans keep vehicles for five to ten years, on average.
- ◆ Optimism for oil drilling in new regions is high because of discoveries in the Gulf of Mexico, privatization of oil companies in South America, the Hibernia field in Newfoundland coming on line after 40 years, and the vast potential of the Caspian Sea region. However, this must be tempered with the reality of diminished oil services capability worldwide. The collapse of oil prices in the 1980s, not only forced drilling companies out of business, but equipment and trained employees met similar fates. Now, many oil drilling projects are being delayed for lack of equipment and personnel. Little change in these circumstances is projected in the future.

State Trends

As noted in the section on Nebraska production, the state's ability to produce oil is diminishing, especially so long as price volatility remains a factor in crude oil markets. Because a significant portion of the state's oil is thousands of feet below ground, production costs are considerably higher: a Nebraska oil company stated several years ago that it cost around \$20 to produce a barrel of oil in the state; costs in Saudi Arabia average \$2 a barrel. So long as petroleum costs remain in the \$18-\$22 range or lower, a resurgence in oil drilling and production in the state should not be expected. Confirming this statement is the fact that drilling well permits in the state reached a 60-year low in 1996. The price volatility of oil and related products noted in



Source: Nebraska Oil Activity Summary, Nebraska Oil and Gas Conservation Commission, Sidney, Nebraska, Annual

Total 1996 Crude Oil Production 3,543,110 Barrels

the national trends section played a significant role in Nebraska during the winter of 1996-1997. Low supplies, higher oil prices — due to continuing problems with Iraq — and colder than expected winter weather combined to send prices much higher than initially projected in fall 1996. The Energy Information Administration expected propane and heating oil prices to rise about ten percent over 1995 levels. October 1996 found oil prices at around \$25 a barrel, rising \$4 since June, and reaching their highest price in ten years. Refined products produced from crude oil — diesel fuel, gasoline, heating oil and propane — all soared accordingly. In December 1996, propane dealers across the state were reporting prices hovering around \$1 a gallon, double the 1995 price. In some cases, prices for propane reached record peaks. In January and February, propane prices, as well as prices for other petroleum products began their traditional seasonal declines.

Alternate Energy

Efforts to develop clean, abundant and affordable alternates to the use of fossil fuels have been aided by five factors — technological improvements, increasingly stringent environmental laws, federal research funding, utility regulators and broad-based public support.

Because Nebraska is a public power state, utility regulators are not considered a factor in fostering the growth of alternate energy forms in the state. The impact of federal research budget cuts on alternate energy by Congress will, over time, result in slowing technological progress and reductions in the cost of alternate energy.

The five main alternate energy sources — biomass, geothermal, hydropower, solar and wind — are detailed in this section.

State Production and Consumption

In 1995, hydropower supplied an estimated 2.5 percent of the total energy consumed in Nebraska. Biomass, in the form of ethanol, supplied 0.3 percent in 1995. The Energy Office estimates that in 1995, all five forms of alternate energy supplied approximately three percent of the energy used.

While energy production from alternate energy sources is increasing, the increases are generally very small.

National Trends

According to the U.S. Department of Energy in its *Renewable Energy Annual*, 7.9 percent of the nation's total energy needs were met by renewable energy resources in 1996, the most recent year available.

Nearly half of the renewable energy came from hydroelectric resources, followed by biomass (45 percent), geothermal (six percent) and solar and wind (one percent each).

State Trends

As indicated above in "State Consumption and Production," alternate energy production and use have remained fairly constant over the years, despite the state's overall growth in energy consumption.

Several legislative bills seeking to advance different types of alternate energy — from wind to biomass — were offered for consideration during the 1996 session of the Unicameral. None of the bills were passed by the senators.

The state's two largest utilities are taking different approaches to the use of alternate energy sources. Nebraska Public Power District, the state's largest, is using tires and the residue left from burned coal — called fly ash — to supplement traditional fuels in generating electricity. The utility is also participating in solar and several wind generation tests. The state's second largest utility, Omaha Public Power District, is currently involved in one of the wind generation studies, but continues to monitor renewable developments closely.

Fuel Source Types

Biomass

While most of the emphasis on biomass energy sources continues to focus on fuels of the future — switchgrass, genetically-engineered trees, garbage and crop wastes — the reality is that, in Nebraska, wood remains the primary alternate biomass fuel in use today, followed by corn used for ethanol production.

Several Nebraska groups are attempting to have the state's utilities generate up to 25 percent of their electricity from biomass sources by 2010.

In northeast Nebraska, several groups continue to examine the feasibility of growing switchgrass to use as feedstock for an ethanol plant.

Geothermal

Geothermal energy use in Nebraska remains limited to small-scale systems such as ground-source heat pumps used in schools, businesses and homes.

Hydropower

Hydropower in the state comes from two sources — 11 hydroelectric dams in or on the border of the state and power supplied to Nebraska by Western Area Power Administration. The power administration transfers hydroelectric power produced in western states to state agencies, municipalities and public power districts. Taken together, all hydroelectric sources met more than 14.4 percent of the state's electricity needs in 1995. Nationally, about 9.8 percent of the country's electricity needs are met annually through hydropower.

At this time, it is not anticipated that other sources having hydroelectric potential will be developed in the state. It is more likely that hydro resources will decline with time. For example, resolution of the relicensing of Kingsley Dam may result in a reduction in the production of electricity.

Solar

Solar or photovoltaic energy continued to make significant technological gains in reducing the cost of electricity from this

power source. In 1996, three American solar panel production facilities came on line and six more plants are scheduled to begin operation in 1997.

By that time, electricity produced from solar power is expected to cost 12 cents per kilowatt. Currently costs are estimated at 18 cents a kilowatt, down from \$2 a kilowatt in 1976.

The worldwide market for solar is greater outside economically developed countries, especially where infrastructure is non-existent. An estimated one-third to one-half of the world's population currently lives without electricity. In 1995, solar power worldwide grew 18 percent and is expected to grow annually by 20 percent through 2000, according to industry sources.

Solar Two, a ten megawatt plant in the California desert, became operational in 1996. Teaming solar panel technology with storage concepts, the plant is capable of producing power when it's needed, not just when the sun is shining. The federal government-electric utility experiment is producing electricity for ten cents a kilowatt and will operate through 1999.

The key to advancing solar technology remains moving from a one-of-a-kind prototype to mass production. When solar cells are mass produced, the cost of production plummets. For example, if the technology used in the California test could be mass produced, it has been estimated that electricity from the solar cells could be produced for 5.5 to 6 cents per kilowatt, including one cent for maintenance. However, this is still above current Nebraska electricity production costs, but well below the national average price of eight cents per kilowatt.

Current, cost-effective use of solar cell technology in Nebraska is primarily limited to the powering of electric fences by cattle producers. However, solar water pumping technology — both installed and portable — is becoming more available.

One of the state's rural electric systems, Wheatbelt in Sidney, is continuing to test a solar-powered pump for livestock wells. Other tests are being conducted by Nebraska Public Power District, KBR Rural Public Power District near

Ainsworth and inventor Dick Koetter who is testing water pumping units in Trenton, Cambridge and McCook. Remote, sparsely settled areas are where solar power can be cost-effective in today's America. These types of solar units would be far cheaper than rural electric's current alternative — constructing a new power line for \$18,000 per mile, plus operation and maintenance costs.

Wind

As of late 1995, more than 5,000 wind turbine clusters were generating electricity in Iowa, Minnesota, New York and Texas. California, which leads the nation with 15,000 turbines, produces about one percent of the electricity it uses from wind.

In Nebraska, two wind studies announced in 1993-1994 continued during this reporting period.

Earlier studies by the Union of Concerned Scientists had estimated that wind resources in the state were sufficient to supply 120 times the amount of electricity currently being used in Nebraska — the equivalent of seven percent of the electricity used in the nation.

The first wind study is being conducted near Ainsworth by Nebraska Public Power District, KBR Rural Public Power District and Battelle Pacific Northwest Laboratory, part of the U.S. Department of Energy. One of five studies in the nation, Ainsworth was selected because earlier studies found the area to have good potential for wind generation in the summer, when the state's electricity need is greatest and the site is also located close to an existing transmission system — both important factors. Nebraska Public Power District found the initial results so promising that additional monitoring sites in the area were installed. The utility has even started working with manufacturers to modify existing wind turbine technology so that it is more suitable for Midwest terrain. The Ainsworth site recorded an average wind speed of 15.8 miles per hour.

The second, and larger study is being undertaken by the Nebraska Power Association and the Energy Office. The \$300,000-plus, three year study first concentrated on sites near Imperial, Kimball, Rushville, Springview, Stuart, Valentine, Wahoo and Winnebago. According to the study consultants, six of the eight sites — all but Rushville and Wahoo — had potential for wind generation development. The study is scheduled to conclude in 1999.

During the reporting period, Nebraska Public Power District, Lincoln Electric System, the Municipal Energy Agency of Nebraska, the city of Grand Island and several others announced the utilities had been selected by the federal energy department to negotiate to build a 1,500 kilowatt wind energy project. The project is expected to cost \$2 million for the two wind turbines. Depending on the pace of negotiations, the lead utility, NPPD, said the earliest the turbines could be up and running would be in late 1998. While the final site has not been selected, Ainsworth is the likeliest location.

Other Notes of Interest

Experts have speculated considerably on the fate of renewables under the restructuring of the electric industry. The most likely scenario is the emergence of two distinct trends: a reduction in generation from renewable resources by utilities that previously had been forced to buy the more expensive power by state regulators, and an increase in generation by some utilities or electricity marketers that specialize in electricity generated from renewable resources. In the latter case, these utilities or suppliers would be creating a product — "renewable electricity" — for which there is a small, but strong consumer demand.

"For the cost of three days' worth of electricity in July, Grand Island can participate in a 20-year project that attempts to make the generation of wind power less expensive."

Editorial, *Grand Island Independent*
March 28, 1997

The Energy Office logo found on the back cover is from the "Genius of Creative Energy" floor mosaic by Hildreth Meiere located between the vestibule and foyer inside the north door of the State Capitol in Lincoln.

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